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## Original Contributions.

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### THERAPEUSIS AND TREATMENT OF INTERSTITIAL GINGIVITIS DUE TO AUTOINTOXICATION.

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Former research has been confined to etiology, pathology and diagnosis, so I intend here to discuss treatment. For more than a decade I have paid special attention to constitutional treatment of patients that have required such services. This has been most fascinating as well as satisfactory research. For reasons elsewhere mentioned, interstitial gingivitis due to autointoxication first manifests itself in the alveolar process. In therapy it was therefore necessary to examine the gastro-intestinal canal, liver, urine and blood pressure.

Of one hundred and fourteen patients under consideration sixty-four had received local treatment by other dentists and had obtained more or less temporary benefit. Later the disease had returned. The patients ranged from thirty-eight to sixty-nine years of age. All had symptoms of autointoxication. Eighty-two had more or less headache; eight at times had sick headache and vomiting; six were irritable and forty-six were fatigued. These symptoms are due, no doubt, to the open winter. It was difficult for the eliminating organs to adjust themselves to the unusual climate of Chicago. Seventeen had muscle soreness and itching; twenty-two had neurasthenia to a more or less marked degree, accompanied with neuritis; eleven had cutaneous eruptions; seven had arteriosclerosis; sixteen had rheumatism; nine had albuminuria; two diabetes; twenty-nine were more or less nervous; six had asthma; ten were markedly constipated and eighty-four had gastro-intestinal fermentation which produced

indol in the small intestines and indicanuria. The other twenty also may have shown indican, since urinalysis in all patients with interstitial gingivitis has shown it. Thirty-two had flatulence to a marked extent; twenty-six had sour stomach; eight had had syphilis and seventeen gonorrhea; four had tuberculosis; two had pleurisy; nineteen had been previously salivated; one hundred and seven showed above normal blood pressure and all had interstitial gingivitis.

In treating such patients the stomatologist must be as familiar with general diseases as the physician. He must be more alert than the general practitioner for the reason that he can forewarn his patient of the oncoming storm, while the physician usually is not called until the storm has already broken.

The trend of medicine is toward prophylaxis. The stomatologist in treatment of interstitial gingivitis has the advantage of the general practitioner, since the former is able to prevent the tendency to more grave disorders. Many times have I told my patients after urinalysis that they were suffering with auto-intoxication which required treatment. They would later return with the statement from the family physician they were in perfect health. Had the family physician recognized the tendency to grave disease portrayed in the mouth, his diagnosis would have been far different. The patient with interstitial gingivitis due to auto-intoxication is sick, so far as the stomatologist is concerned, though able to come to the office and attend to his duties. He is not sick in the eyes of the family physician, since the symptoms have not markedly manifested themselves constitutionally. When the organs are involved, although interstitial gingivitis be present, to treat such conditions is beyond the province of the stomatologist. The attending physician should be informed. I have saved patients from an early grave by anticipating a tendency to grave disease avoidable by strict attention to diet and treatment. In other patients, in which grave symptoms were observable, I was able to inform the family physician in time to prevent serious results. In a few it was impossible to prevent rapid progress of disease already well advanced when they came under notice. There are people in their graves who might be alive and well had they changed their methods of living when requested to do so. Club life and fast living have carried many a man and woman to

an early grave. More people are injured by overeating than overdrinking.

The first symptoms of pathologic effects due to autointoxication are observable in the alveolar process. In the treatment of interstitial gingivitis, the stomatologist should be mindful of the fact that the patient's system is tending toward disease. After more than ten years' research I am able to give a reliable treatment which graduates of any reliable dental school may prescribe with perfect safety and positive results.

In my discussion of "Interstitial Gingivitis Due to Autointoxication as Indicated by the Urine and Blood Pressure," I reported fifty cases. Every examination showed want of balance in the eliminating functions. Accumulation of waste products in the system means interference with oxidation as well as imperfect elimination. In most cases this interference with the oxidation and imperfect elimination is due, first, to the senescent and tired out eliminating organs. With age the bowels and kidneys lose tone, and as a result waste products or toxins circulate in the blood. Between the ages of twenty-five and forty odors emanate from the lungs in the breath, from the armpits and about the thighs. The skin and the lungs are trying to do the work of the bowels and kidneys. Second, constipation and want of proper attention to the bowels. This is particularly true of women. The fact that there are one, two or even three loose movements of the bowels each day does not demonstrate elimination. A twenty-seven-year-old woman had not been feeling comfortable for some time. There were no marked symptoms. She felt tired, face drawn, skin and eyes had a bluish color, headaches and pain in the back. The alveolar process was tender and, as she expressed it, "itchy," and the teeth sore to touch. Urinalysis revealed specific gravity 1007, reaction acid, albumin trace, urea 0.7 per cent, indican, degree of acidity twenty *in lieu* of thirty to forty-five. She had one, sometimes two, bowel movements a day. The bowels, however, were packed with fecal matter. Her physician requested her to flush her bowels with warm water and call the next day. On return still more fecal matter was found. Four similar treatments were required before the bowels were cleared. A fifty-six-year-old woman had been treated locally by a dentist for eight years. Her teeth grew worse each day. The alveolar

process was nearly destroyed and most of her teeth were banded. When she came to me she had a tired look, face drawn, skin and eyes discolored. The muscles of the right side of the face and lips twitched. She was taking pus into her stomach with every swallow. Urinalysis showed specific gravity 1029, hyaline and granular casts, a few pus cells, urea 2.6 per cent, indican, degree of acidity fifty. I removed the loose teeth and turned her over to her physician, who found the entire bowel filled with fecal matter. In a similar case a fifty-five-year-old woman had an impacted bowel, in the center of which was an opening about the size of a silver quarter, through which opening soft fecal matter passed after taking daily medicine which had become necessary. This accumulation had been present for more than a year. Such cases are frequently encountered.

Constipation and want of proper attention to the bowels requires more extended treatment. The patient must have a particular time for evacuation of the bowels each day. The best time is after breakfast; the hour selected should not be varied from in the least. Here two methods may be employed. As a substitute for the bile acids a saline laxative may be used, which will excite the secretions of the mucous membrane throughout the alimentary canal and also stimulate normal peristalsis. Von Noorden claims he can cure constipation by dietetic measures in from three to six weeks. Boas finds the method successful in the most obstinate cases. The laxative elements of the food in an anti-constipation diet consists of water, salt, sugar, acids, fat and the indigestible residue of the food, chiefly cellulose. He recommends from half a teaspoonful to one teaspoonful of salt in a glass of cold water before breakfast. Dr. J. H. Salisbury ("Habitual Constipation," *The Alkaloidal Clinic*, August, 1905), who has had marked success with this treatment, claims lemon juice, another laxative element, increases the palatability. Diet is very important in this connection. In some patients the muscles of the stomach are weakened, in others there is a lack of hydrochloric acid. Examination of the stomach contents is often necessary to determine its condition. If the patient be taking little nourishment there is most likely a deficient secretion of hydrochloric acid. This would favor constipation. Strychnin is here indicated as a bitter and a tonic which increases the appetite and strengthens the muscles of the

stomach. One great source of constipation is lack of water in the system. The feces become dry because the water in the intestinal canal is absorbed. This may be demonstrated by measuring the amount of urine passed every twenty-four hours. The normal amount should be three pints, or forty ounces. That much water should be drunk each day, including tea, coffee and milk. Bacteria being present there is always a certain amount of putrefaction, food decomposition occurring all the time. A regular soft movement every day is desirable. This, however, does not always prevent putrefaction, especially when foods containing germs are carried into the intestines or special foods which are acted upon by the bacteria are already in the bowels. Distinction should be made between normal fermentative decomposition of albumin brought about by the action of gastrointestinal secretion, and putrefactive decomposition of the same albumin due to putrefactive microorganisms which gain access into the bowels and exercise pathogenic action. Absorption of these products into the blood sets up the symptoms already enumerated. The necessity of counteracting this putrefactive decomposition of albumin in the small intestines brings the practitioner face to face with hepatic insufficiency.

Third, hepatic insufficiency, which means inability of the liver to perform its function. The causes of hepatic insufficiency have been conveniently classified by Abbott (*Alkaloidal Clinic*, December, 1904, page 1231) under three heads, viz., (1) mechanical, (2) infectious (parasites), (3) toxic. From my personal experience, I am inclined to add (4) arrested development of the organ. When any one or all of these causes exists it is not to be wondered that autointoxication takes place. The intestinal tract at all times contains bacteria, many of which are toxic. Decomposing albuminoid substances which often become putrified and poisonous pass via the portal system, through the liver, which is constantly exposed to their toxic influences. The function of the liver is to restrict or prevent putrefaction. This is accomplished in three different ways, (1) by sending into the upper portion of the small intestines bile capable of destroying putrefactive bacteria the entire length of the small intestines, but more particularly the upper portion. (2) It destroys the albuminoid products already decomposed, thus preventing them from entering

the circulation except in an innocuous form. In this manner they are eliminated chiefly through the kidneys without pain. (3) The liver is an excretory organ in that it sends back into the bowel non-toxic material which was originally toxic when passed into the liver. The liver therefore is a secretory as well as an excretory organ. This paper deals with the liver as a secretory organ alone and with what takes place when the secretion is arrested or changed in character.

The bile acts in four different ways; first, it stimulates peristalsis of the small intestines; second, it regulates the degree of fermentation; third, it assists in emulsification and saponification of fat globules in the intestines, and, fourth, it destroys putrefactive bacteria. The poisons generated in the intestinal tract are gathered into the portal system and carried to the liver cells by the capillaries. For a time these cells can dispose of the toxins by destroying them. If the stream continues to flow beyond the capacity of the liver to exercise its disintoxicating function the liver becomes impaired. The bowel poisons then enter the circulation. Deficiency of bile, whether due to tired out liver cells or arrested liver development, will cause retention of waste products, constipation and putrefaction, with resultant autointoxication. Waste product of general metabolism also must be considered with those poisons from the intestines, which poisons bring about toxic effects. When the exhausted liver cells can no longer perform their functions normally, the poisons, brought to the liver through a network of lymph and blood vessels from the general circulation, can no longer be converted into innocuous end products—urea, uric acid, creatin, etc.—but are carried into the general circulation unchanged. These toxins, together with those from the intestines, if not quickly eliminated through the kidneys, produce self-poisoning.

Putrefactive changes in the intestines are indicated by flatulency of the stomach and bowels, and acid stools with considerable odor and distended stomach and bowels. These in turn indicate hepatic insufficiency or liver inactivity, causing all of the symptoms enumerated. Indicanuria is a positive proof. Indican is derived from indol, a product of albumin putrefaction in the small intestines. Indican is a colorless, syrupy, bitterish derivative, also obtained from indigo plants. Other poisons in the urine, sweat

and saliva demonstrate further that toxic substances from the intestines are circulating in the blood. The toxic products circulating in the blood affect the heart and cause a high blood pressure. High blood pressure, together with toxic products circulating in the blood, set up inflammation in the alveolar process and gingival border. In the alveolar process, first, because the arteries in the soft gum tissues, under high blood pressure, can and do expand and the tissues recover as soon as the cause is removed, but the arteries running tortuously through the bone cannot expand, and the blood pressure and toxic products cause inflammation and absorption of bone tissue without restoration. Hence the term "interstitial gingivitis" (deep-seated inflammation in the alveolar process). Cardiac-vascular, nervous, hepatic and renal diseases, as related to interstitial gingivitis, are therefore due to the same cause. In relieving or removing the cause of interstitial gingivitis the other symptoms and diseases are relieved, and vice versa.

In treating interstitial gingivitis due to autointoxication the best results can be obtained by cleansing the body from decomposing and foreign substances and placing the eliminating organs in a healthy condition. The mouth should be cleaned up, the bowels down, the internal organs inside, the skin outside, and all kept clean. In prescribing for autointoxication, note the symptoms and then apply the indicated remedy. There are marked differences in susceptibility to drug action. No two persons are alike. The child does not require the dose of an adult. No two have the same symptoms. The heart, temperature, and to all appearance the bowels, are normal, yet groups of symptoms show that waste and repair are not in harmony. Dosage therefore varies considerably. A lean, active man who eats little and is abstemious requires different dosage from that for a fat man of full habits leading a sedentary life with unhygienic habits. To prevent overdosing, or "dose enough," as Dr. Abbott calls it, the stomatologist should fix his mind upon the results he wishes to obtain and give a minimum dose at intervals until the results desired are obtained.

Autointoxication is due to putrefactive changes in the intestines arising from a want of sufficient bile to cause peristalsis and destroy the bacteria. Urinalysis demonstrates exactly what is

taking place and what is required in the way of treatment. In connection with a retention of toxins, such symptoms are observed as loss of appetite, headache, loss of memory, vertigo, insomnia, tinnitus aurium, general nervousness, biliousness, irritability, weakness, cold extremities, melancholia, impotence, malodorous breath, leg cramps, twitching of muscles, muddy complexion and many other symptoms.

Treatment must be discussed in the manner already mentioned. First as to the senile stage or tired out eliminating organs. The first indication is to remove the cause and cleanse the bowels. This may be accomplished by flushing the bowels with soap and water once or twice per week, restoring the tonicity of the bowel muscles by massage. A saline laxative upon rising in the morning, once or twice per week, is likewise beneficial. In minor ailments, such as above mentioned, nothing is better. Cleansing the alimentary canal of all fermented and putrefactive material, keeps the mucous membrane clean and the blood pure, which is always the great source of health.

Since putrefactive changes in the intestines and non-destruction of waste products are largely due to hepatic insufficiency, the liver now requires attention. A remedy that will stimulate the liver and cause a flow of bile may be selected from a half dozen or more preparations. A few will be named in the order of their excellence. The dentist should try all these drugs and methods upon himself to note the results. Calomel may be given by itself or in combination with podophyllin, soda, ipecac, etc. Given alone, it should be prescribed in 1-12 to 1-6 grain every hour until one grain is taken. This is to be followed with a saline laxative. Podophyllin (may-apple, mandrake) gives good results, but is slow in acting, though a direct and positive hepatic stimulant. It acts upon the glandular system of the alimentary canal. In small repeated doses it produces ptalism. As a hepatic stimulant, it requires four to eight hours for action, which may last from one to two days. This drug should be taken in small doses 1-12 to 1-6 grain hourly until  $\frac{1}{2}$  grain is taken, thus preventing griping. A little sodium chlorid will aid its action and will not leave constipation in its wake. Podophyllin should never be given in large doses. Calomel and podophyllin may be combined with excellent

results. Dr. Abbott (*Alkaloidal Clinic*, July, 1905, page 662) recommends the following:

Calomel .....	1-6	gr.
Podophyllin .....	1-67	gr.
Rhein .....	1-6	gr.
Capsicum .....	1-134	gr.

together hourly from six to ten p. m. A saline laxative is used next morning before breakfast. I have used the following prescription with good results:

Aloin .....	1-4	gr.
Strychnin sulphate.....	1-6	gr.
Extract belladonna.....	1-8	gr.
Pv. ipecac.....	1-16	gr.

taken at bedtime. In prescribing either of these, a good saline cathartic should be taken the next morning upon rising to flush the intestinal tract and remove the accumulation that has caused the decomposition. Flushing the bowels with a saline laxative at the proper time to cleanse out the intestinal tract is imperatively indicated. If this be not accomplished when digestion and absorption is re-established excretory material will again be taken up by the portal system and the condition desired will not be obtained. If the stools are still unhealthy and putrefaction is not removed, administer, every two to four hours, two to five grains of the compound lime, soda and zinc carbolate. This should be given until the stools become normal in color and odor. To stimulate the liver, some of the bile acids may now be given. Bilein, a mixed alkaline salt of the bile acids, in doses of 1-12 to 1-4 grain, four or five times a day, is indicated. Bilein acts in two ways—it mitigates the morbid condition due to a lack of bile secretion and stimulates the organ to resume its function.

The urine must now be considered. The patient (adult) must void three pints, or forty ounces, each day to be healthy. If the amount be less, elimination treatment is required. The normal specific gravity is from 1.015 to 1.025. The specific gravity is readily obtained by the ordinary "urinometer." As a rule the specific gravity is high when little urine is voided and low when the flow is abundant. The specific gravity is an index to the amount of urinary solids. The method of obtaining the amount of solids has been considered in another paper. The normal

amount for a healthy adult male is 1,200 grains of urinary solids daily. If, therefore, the amount of urine voided in twenty-four hours is less than forty ounces, and if the specific gravity is high, eight to ten glasses of water, including milk, tea and coffee, should be taken each day. Urine acidity may be determined by litmus paper. The blue immersed in urine will turn pink if the urine be acid. If the pink paper be used and it turns blue the urine is alkaline. The urine should normally be acid. This is but partially satisfactory, since degree of acidity alone is accurate, 30 to 40 degrees being normal. When the urine is abnormally acid, a three-grain lithia, sodium bicarb. or sodium chlorid tablet in a glass of water four times a day is indicated. This treatment will remove the solids, including the urates, and free the capillary circulation of its obstruction. If the patient be over forty years of age and absorption of the alveolar process has been severe, it is advisable at first to have a complete urinalysis to anticipate more severe lesions, such as diabetes, Bright's disease, casts, etc. If these conditions exist the patient must return to his family physician for treatment; if they do not exist the simpler methods, as mentioned in this paper, may be adopted by the dentist. The treatment which I have devised will relieve the distention and pressure of the blood vessels in the alveolar process, as well as in other parts of the body. This treatment is based upon the results of years of original research on etiology.

After the preliminary treatment, the patient should be given a complete change. If well to do, send them abroad; if they live in the interior, send them to the seashore; if at the seashore, to the interior or mountains; if in the South, North, and vice versa. Usually these people cannot stand cold weather; a warm or hot climate is beneficial. Hot springs and baths are always indicated. If they cannot afford to travel, let them take Turkish baths and drink hot water. Massage is also indicated. Usually these people are high livers. Restriction and change of food is necessary. Patients should be placed upon coarse, simple food and reduce the amount. This will cause peristalsis and the bile acids can take care of the waste products. It may be necessary to change from a starchy to a nitrogenous diet, and vice versa. Each patient must be treated according to symptoms.

The patient must return to the stomatologist, in some cases as

often as every two weeks to six months, to have the local irritants removed and be advised. If the teeth can be preserved "until death do us part" we shall have received our reward. There are many details in relation to the treatment, but time will not permit further discussion.

I cannot close this paper without condemning certain manufacturers, who for financial reasons force upon the dental profession effervescing and other preparations to neutralize uric and other acids, entirely ignoring the cause, uric acid not being a cause, but only an expression.

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## WHAT IS THE EFFECT ON PROGENY OF THE LOSS OF TEETH IN ANCESTRY?

BY M. H. FLETCHER, D.D.S., M.D., M.S., CINCINNATI, OHIO. READ BEFORE THE SECTION ON STOMATOLOGY OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1906, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

In almost every country family there is a sub-family of dogs and my father's household was no exception to this rule. When I was a boy, there was born into our sub-family a pup with a short stump of tail, identical in proportion to his father's, whose tail had been cut off to suit the prevailing style. This fact attracted my attention very strongly, and in looking over my research work I can see it has had great influence on my opinion as to variation in species and the law of heredity, to the end that I believe acquired defects in teeth as well as in tails can be inherited from ancestry.

*Darwin and Heredity.* De Vries, Haeckel and others, in recent work, have made advances in working out details of Darwin's theories of inheritance, variation and natural selection, but none have cited evidence to disprove his main position; on the contrary, most research tends to establish and to strengthen him, hence I shall quote freely from his "Origin of Species."

In the chapter on "Variation and Inheritance," on page 11, he says:

"Any variation which is not inherited is unimportant for us. The

number and diversity of inheritable deviation of structure, both those of slight and those of considerable physiologic importance, are endless. Dr. Prosper Lucas' treatise, in two large volumes, is the fullest and the best on this subject. No breeder doubts how strong is the tendency to inheritance; that like produces like is his fundamental belief; doubts have been thrown on this principle only by theoretical writers. . . . Everyone must have heard of cases of albinism, prickly heat, hairy bodies, etc., appearing in several members of the same family. If strange and rare deviations of structure are really inherited, less strange and commoner deviations may be freely admitted to be inheritable. Perhaps the correct way of viewing the whole subject would be to look at the inheritance of every character whatever as the rule and non-heritance as the anomaly.

"The laws governing inheritance are for the most part unknown. No one can say why the same peculiarity in different individuals of the same species, or in different species, is sometimes inherited and sometimes not so; why the child often reverts in certain characteristics to its grandfather or grandmother or more remote ancestor."

Variation under domestication is more rapid than variation under Nature, for in the former we have conscious selection of variations, and in the latter unconscious or selection by chance. The study of these laws led Darwin to advocate his belief in natural selection or the law of survival of the fittest. On page 121, he says:

"In one sense the conditions of life may be said not only to cause variability, either directly or indirectly, but likewise to include natural selection, for the conditions determine whether this or that variety shall survive. But when man is the selecting agent, we clearly see that the two elements of change are distinct; variability is in some manner excited, but it is the will of man which accumulates the variations in certain directions; and it is this latter agency which answers to the survival of the fittest under Nature. From the facts alluded to in the first chapter I think there can be no doubt that use in our domestic animals has strengthened and enlarged certain parts, and disuse diminished them; and that such modifications are inherited. Under free Nature we have no standard of comparison by which to judge of the effects of long-continued use or disuse, for we know not the parent forms; but many

animals possess structure which can be best explained by the effects of disuse."

It would seem that the intelligence of man makes him the more liable to degenerative effects, except in intellectual progress, for our protected lives favor fluctuating variability and accumulate the variation. Man's intelligence is strenuously exercised to improve his beast, but under our present social system his own qualities cannot be bred for improvement. Undoubtedly we grow physically weaker as we grow intellectually stronger. Fisk says that in man, "the ape and the tiger will become extinct and a process of psychologic change take their place. Henceforth, the dominant aspect of evolution in man is to be, not the genesis of species, but the progress of civilization." There can be no doubt, however, but that the evolution of both mind and body in man, will keep him and leave him in his proper and natural place, for such are these laws of our Creator.

*Deterioration of Teeth.*—If modifications appear constantly under the tedious and accidental selection of Nature, conscious selection under the wholesale extraction and disuse of teeth in man must accumulate this variation and result in the deterioration of these organs. This extraction of teeth, however, cannot properly be called conscious selection, for there is no premeditation in this sense, neither is there any fight for life in these organs, in the sense this term was used by Darwin. On account of artificial environment and misuse of the teeth, incident to civilization (if one might be allowed the liberty), this process in man could be called by the paradoxical term, artificial natural selection. Deterioration of teeth in man might be supposed to have begun when he ceased to use them as organs of defense, or when he began to build fires and cook his food, a thing wholly unknown to Nature, except with man. With fires and cooking, no doubt, many degenerative features began in his physique.

There is much discussion as to whether acquired variations or mutilations are inherited. Darwin says: "The evidence that accidental mutilations can be inherited is at present not decisive. But the remarkable cases observed by Brown-Séquard in guinea pigs, of the inherited effects of operations, should make us cautious in denying this tendency." In another place under the head of abortive organs, he says: "We have plenty of cases of rudimentary

organs in our domestic productions, as the stump of a tail in tail-less breeds, the vestige of an ear in earless breeds of sheep, the reappearance of minute, dangling horns in hornless breeds of cattle," etc. The teeth of man certainly can be no exception to this tendency.

#### VARIATIONS AND HEREDITY.

Variations are divided into two classes. First, those that are congenital or inborn, such as appear at birth and have no discoverable origin aside from life force; second, those that appear after birth, and seem to be due to environment, such as use or disuse, the effects of food, climate, conscious mutilation, conscious selection. Syphilitic and other diseases peculiar to civilization often produce defects and variations which are also inheritable.

*Conscious Selection.*—While we could hardly expect to see an unusual development of the hands of a child because its father or mother is an expert pianist, we do, under conscious selection, see most extraordinary developments in the pouter, fantail, and other varieties of pigeons, the original stock of which was the well-known rock pigeon. Again, in color, size and varieties, of horses, dogs and cattle, we have features of the laws of heredity, which are hard for us to understand. These anomalies appear when least expected. For instance, when we have been breeding for certain features and have followed rules that formerly brought definite results, now and then unlooked-for freaks appear.

*Defective Tooth Structures.*—Most of us can cite instances of families in which there is a defective, malposed, or absent tooth, often an upper lateral, running through several generations. May not this defect or mutilation have started from the loss of a tooth or from a badly decayed tooth in some ancestor? May not a principle have been fixed, by the almost universally defective first molar running back for centuries or generations?

In view of the foregoing, is it not reasonable to assume that the general lack of resistance to decay of the teeth in most races of men is due to the loss of and disuse of teeth in ancestry, with the consequent defective tooth structure in progeny? A condition which seems to grow worse with each generation. Has this not become a fixed principle? It is found by examination of the skulls of aborigines, as well as of existing tribes of men, that with few exceptions all tribes have been and are subject to bad teeth and

defective jaws to nearly the same extent as civilized man. This fact has been confirmed recently by Dr. W. J. Younger's examinations of Egyptians and Egyptian mummies. I believe one would be safe in assuming that a large majority of the human race have lost one or more teeth before the age of thirty, and a very large per cent has lost eight, ten, or more. The first loss most frequently being the first molar. In each case there is a loss of bone as well as of teeth, and what we know of heredity would make one believe that these mutilations can be handed down, if not in total absence of tooth or bone at least in defective structure.

Talbot lays stress on unstable or defective nervous system as a cause of these heredity defects and goes more largely into degeneracy of the head, face, jaws and teeth, but I believe does not discuss to any degree the question of defective teeth, or the loss of teeth in ancestry as affecting these special organs in progeny. One can easily admit that an unstable nervous system can affect the whole being. Any animal born perfect with the exception of one organ may perish immediately. Defective organs, such as eyes, ears or teeth, necessarily weaken the entire organism so that in the wild state the creature soon dies or lives for a time in an imperfect condition. The nervous system, as well as other organs, being unstable and inefficient, the animal succumbs to disease or to natural enemies long before its allotted time; hence the law of survival of the fittest. This law is not so strenuous with man, especially civilized man, since his intelligence and sympathy result in the protection and preservation of imperfect individuals. And imperfect humanity, under civilized protection, seems to be the class that propagates more freely than others, with the result that we have great numbers of degenerates, in one form or another. These continue to hand down their defects to their progeny, and no one organ seems to suffer this degeneracy more than the teeth, they being greatly prone to decay, accessible to removal and held in light esteem. Talbot supports the truth of inheritance of mutilation, giving statistics to show that circumcision in the Jewish race results in absence of, or defective prepuce in about 3 per cent of male Jewish children.

In endeavoring to get some fixed idea of how many teeth are lost annually, I secured an estimate from a prominent manufacturer of the number of artificial teeth produced each year in the United

States. His estimate was the astonishing number of thirty-five millions. There may be various reasons *pro* and *con* for this not being a fair figure to calculate from, but it has a basis of truth and is the best plan I know on which to proceed. Thirty-five million teeth lost annually to the people of the United States would leave us, at the average age of 30, with only two teeth apiece, and this evidently is not the case. If, however, we assume the average loss to each one in a lifetime to be 5 and assume the average age to be 30, this would make an average annual loss to each individual of one-sixth of a tooth, or 13,333,333 for the United States. This means 40,400 pounds (330 teeth to the pound) or a large freight car loaded to its full capacity each year with human teeth, lost in the United States alone. Assuming the population of the earth to be one billion, five hundred million, the annual loss to mankind would be 757,576 pounds, or 18 carloads of 40,400 pounds each. These numbers are almost unthinkable, yet I believe they approach the truth.

Reparative dentistry is almost wholly unknown with the common people of all nations, and even with people able to pay comparatively little dentistry is done where it should be, and numbers of teeth are lost for every one that is repaired or replaced. Throughout civilization there is no other organ of the body held in so slight esteem. Blacksmiths, barbers, physicians and even dentists dispose of teeth without thought of their importance. The only requirement in nearly all instances is that the patient himself wants the tooth out. One might say that the loss to future generations is never considered, and few really consider seriously the loss to themselves. If they can only get rid of the offending organ they are satisfied. In their desire to save their teeth they are little better than savages. I also believe that almost as many teeth are lost from disease of the gums as are lost from decay and accident.

The ability of civilized man to compensate for these losses, by the use of cooking and other methods of premasticating and preparing foods, enables him to live almost a normal healthy life with no teeth at all, or with poor substitutes. This compensation by intelligence applies to all disorders and conditions and accounts for the lack of application of survival of the fittest to man in the same degree that it does to other species of organic life not affected by civilization. Defective or diseased eyes or ears nearly always cause the

affected individual to make efforts to save them, or to make them better; the same is true of other organs of the body; but the teeth seem to be of less importance to the majority, otherwise dentists would be many times more numerous and in much greater demand. Who knows the far-reaching effects on the present or future generations from the loss of these organs at the present rate? The effect does not stop with the mouth and teeth, for the condition of each separate organ affects the whole organism either to a limited or to a greater degree, and it must be of the greatest importance to life and health that this vestibule of the body, through which all the nourishment of life must pass, should be kept in as perfect condition as possible.

#### THE LAW OF INHERITANCE: THEORIES.

The law of inheritance has been deeply studied by many of our most scientific minds for generations, yet up to the present, the practical results of breeding in plants and animals give us most of our knowledge. To go deeper into the subject means to take up the study of cell life, but when one has gone into this branch of biology far enough to discuss intelligently the idioplasm theory of Naegle, along with the beautiful theories of others, we are still left with only the facts as brought out by conscious and systematic breeding. This is indicated by Professor Edmund Wilson. ("The Cell in Development and Inheritance," p. 434.) "Yet the splendid achievements of cell-research in the past twenty years stand as the promise of its possibilities for the future, and we set no limit to its advance. . . . We cannot foretell its future triumphs, nor can we doubt that the way has already been opened to better understanding of inheritance and development." To go deeper than cell life means to debate whether heredity is heredity, or whether it is variation and modification due to environment; to go farther still is to discuss the point as to whether all matter is dead, or all alive, and so on into unthinkable propositions.

On the side of thinkable and practical results, we have many assiduous workers, but no one seemingly has done so much with such telling results as Mr. Luther Burbank, whose new creations in plant life seem to have upset some ideas, heretofore accepted as laws. In place of conclusions based on observations of dozens or hundreds of plants, Mr. Burbank decides only after observation on thousands or millions of individuals and many generations of

tests. His experiments seem the only ones which at all compare in figures with the enormous losses of human teeth.

By keen and intelligent selection from millions of specimens he accomplishes in ten years what natural selection would probably require ages or æons to do, and does it with a much greater benefit to mankind and to science. Regarding the so-called Mendelian Laws, which refer to heredity in the breeding of plants, his biographer says (Harwood: "New Creations in Plant Life," p. 342):

"Over and over again, through a series of many years, dealing with millions of plants, and on a scale which dwarfs all other experimentation, Mr. Burbank has disproved these laws. . . . Leading scientists have maintained, and their followers have added the weight of their evidence that acquired characteristics are never transmitted. In the limitless fields of operation before him, Mr. Burbank has not only disproven this over and over again, but has established the opposite, that acquired characteristics are the only ones that are transmitted. . . .

"Regarding the laws governing mutation or saltation, Mr. Burbank, times without number, has produced these strange mutations at will. They can be produced, he says, by anybody who systematically sets to work to disturb the life habits of the plants. Thus the peculiar phenomena which scientific observers on a small field have so sedulously studied, and have at last come to consider the result of a supreme act of Nature, are entirely within the province of any market gardener or amateur plant breeder.

. . . Putting the matter in condensed form, Mr. Burbank says, 'Heredity is the sum of all past environment. Heredity now becomes something far different from what it had before been held to be. Every plant, animal and planet, occupies its place in the order of Nature by the action of two forces, the inherent constitutional life force, with all its acquired habits, the sum of which is heredity, and the many complicated outside forces or environments.'

If, then, it be a law of heredity that variations and acquired habits are the ones transmitted and that this "principle is indelibly fixed by repetition," also the mutilations may be inherited, what should we expect in the case of such enormous losses of teeth as are now, and for so many ages have been, going on in the human race?

Under these laws and conditions we would not expect the absence of one or more teeth in thousands, or may be of hundreds of thousands of individuals, but we would expect to find, as indeed we do, teeth of most inferior quality pervading the whole of civilization, with the consequent ravages of disease from their lack of resisting power. A principle of heredity supporting this view is found in the presence of rudimentary incisors in the upper jaw of the calf, which do not erupt, and the rudimentary teeth in the baleen whale, which always appear in the gums, as in the calf, but never erupt and are never of any practical use. There seems to be no question about the law, as previously quoted, that the disuse of parts results in their reduced size and their rudimentary quality, also that the result is inherited.

To sum up the matter, it does not seem that we are in danger of a toothless future, since teeth are always likely to persist in mammals, yet we can imagine a future state in which the teeth of man might be rudimentary, as in the calf. In fact, it is not uncommon now for our third molar teeth to be diminutive in size, or not to erupt at all. In structure our teeth are perceptibly rudimentary, and in consequence, they are lacking in power to live a normal, healthy life. In a former paper I stated that man can live, under civilization, a moderately normal and comfortable life without teeth. This is due to cooking and other methods of pre-masticating and preparing foods, but it is very much more desirable in every way to preserve our teeth as far as possible. Our specialty is making good progress in this direction, though one could wish our knowledge of prophylaxis in this line were greater, to the end that we would escape many diseases and much pain, handing down to progeny stronger jaws and better teeth.

DISCUSSION: *Dr. Eugene Talbot*, Chicago, said that there is no question but that we can produce a new species by mutilation, and that the jaws and teeth are affected by certain conditions that persist in this country and abroad. Perhaps no better illustration of the inheritance of acquired defects can be found, he said, than that seen in the Boston terrier. Dr. Talbot spent some time studying that animal and declared that it is a singular thing that the inheritance of acquired defects is more beautifully illustrated in

this than in any other animal he ever studied. The Boston terrier is about twenty-five years old, it is a cross between an English bulldog and an English terrier. Environment and breeding have produced this new race. These dogs used to have normal tails, and twenty-five years ago the parent dogs had their tails cut off, and by breeding in and in, the present breed with greatly deformed tails has been produced. Professor Wiseman believes deformities are not inherited. Dr. Talbot has many times shown the inheritance of acquired deformities. He has cut off the tails of mice and bred these animals in and in, and in the seventh generation mice have appeared without tails. If he were a young man he should breed dogs with cleft palates and hare lips. If any young man who is ambitious were to take up this thing, in a few years he would be able to produce a new class of animals. In regard to the jaws and teeth, in some places dentists are in the habit of extracting the first permanent molars, but Dr. Talbot believes that the continual extraction of the first permanent molars, in eight or ten generations will shorten up the jaw. He knows this is possible, because the face, jaws and teeth are degenerating. The constant extraction of the first permanent molar as has been done in certain localities has been shown to produce people with deformed jaws, arrest in development and irregularities of the teeth. The fact is, the face, jaws and teeth are degenerating for the benefit of the brain under the law of economy of growth laid down by Aristotle, who first discovered the inheritance of acquired defects. Decay of teeth is a natural process in the evolution of man, and when there is an abnormal nervous system, as in degenerates—in the idiot and in the deaf, dumb and blind asylums—the teeth degenerate very rapidly, indeed. Teeth decay to a greater extent in England than in any other country, due to the fact that the English are a little farther along in the line of evolution.

*Dr. M. L. Rhein*, New York City, referred to the discussion on this subject at Portland, last year. He considers the key note of the situation to be Dr. Fletcher's statement that according to Burbank it is unquestionably proved that acquired defects can be transmitted. This, he said, removes at once all the contention that appeared between Dr. Fletcher, Dr. Talbot and himself in last

year's discussion. At that time, in reference to Dr. Talbot's point as to the eventual dentureless condition of the human race, Dr. Rhein took the position that such a condition would never exist, because something would always intervene that would interfere with any such deterioration in the physical condition of the race as a whole. He thought that the trend of this discussion illustrates the correctness of his remark on that occasion, because, if, according to Dr. Fletcher, acquired defective conditions can be transmitted, it follows as a logical sequence, that restorations of malformations of the maxillæ and teeth can be transmitted in a like manner. The superiority of American dentistry during the past three-quarters of a century has induced in this country an increased attention to the preservation of the natural physiologic condition of the human mouth. Dr. Rhein believes that the mission of American dentists for the regeneration of mouth defects has just begun. The lack of appreciation of the value of the preservation of the first permanent molar by the majority of dentists during the past fifty years has had a very important bearing on the oral deformities met with at the present day. We are just beginning to see, according to Dr. Talbot's well-defined ideas, the effect of transmitted acquirements of such defects. Something, however, has occurred effectually to stop this destructive tendency. The instrument which has intervened not only to prevent any further retrogression from the normal condition but which has become a huge instrument tending toward the restoration of abnormal mouths to the normal physiologic state, is the advanced school of orthodontia, instituted by Dr. Angle. These men have succeeded, not only in calling the attention of the dental world to the necessity of the preservation of the first permanent molar, but have so simplified the work of orthodontia and placed it on such a scientific plane, that the results in the shape of physiologic mouths restored from deformity and malformation are no longer a rarity but a very frequent occurrence in every part of the civilized world where the graduates of this institution have seen fit to locate. The normal development of this condition means in the future that human mouths will approach more nearly to the physiologic than they have in the past few hundred years.

MEDICAL PHASES OF DENTAL DISORDERS.  
BY SAMUEL A. HOPKINS, M. D., D.D.S., BOSTON, MASS. READ BEFORE  
THE SECTION ON STOMATOLOGY OF THE AMERICAN  
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NAL OF THE ASSOCIATION.

Under this head we have two classes of cases which present themselves for consideration. On the one hand, there are those which, while presenting medical symptoms, are directly due to some disturbance in the teeth or the surrounding tissues; on the other hand, we may have a large number of reflex disorders, the origin of which is not always apparent, but which ultimately we find to be located in a diseased tooth.

Whatever the medical phases of dental disorders may be, or wherever they may be located, in the ears, eyes, throat, nose, in the cervical or the salivary glands or even in more remote organs, it is an unfortunate fact that very many of the cases reported as having their origin in diseased teeth bear with them the confession of failure on the part of the physician to make an early and successful diagnosis.

In going over the meager literature on this subject one is struck by the frequent repetition of such a remark as this: "Everything possible was done for the relief of the patient, but he continued to grow worse until some days after the beginning of the treatment, when attention was called to the condition of the teeth. Then it was discovered that there lay the cause of the disease." In the textbooks we find brief allusions to the teeth as disturbers of the neighboring organs, but very little that would be helpful in diagnosis. Fortunately, to become an expert in diagnosing diseases of dental origin, the physician needs only to have the pigeon holes of his memory open so that he will never forget that the teeth may be responsible for many diseases not usually accorded to them. Thus, with a little common sense, he may be able to detect many of these cases almost immediately. The physician will show uncommon sense, however, if he will keep constantly in touch with a capable dentist to whom he may bring these cases of doubtful origin and with whom he may consult.

Consideration of the disorders of first dentition must be passed

over somewhat rapidly. These come at a period of child life when the dentist is not usually employed; and it is quite unnecessary to draw the attention of the physician to this subject, as there has always been a willingness to exaggerate the importance of the erupting teeth as the disturbers of the health of infants. First dentition has long been made the scapegoat to bear the burden of every childish ill. The ignorant or slovenly physician, failing to find the true cause of disease, has been in the habit of referring everything to the teeth. Mothers and grandmothers have caught the infection and have been willing to lay the blame of every disturbance of infantile health on the eruption of the temporary set. Just now a reaction is taking place and a class of men has arisen who, in their contempt for the loose methods of the past, are willing almost to assert that, as dentition is a perfectly normal physiological condition, it cannot, therefore, be responsible for any of the disorders of childhood. Perhaps this is swinging the pendulum too far in the other direction. It is probable that we shall miss the exact truth regarding this matter until a more careful study of the development of the digestive tract is made and proper adjustment of the food of the child to his new requirements is accomplished. Not only is the mouth undergoing rapid development during this period of eruption, but the entire follicular apparatus of the alimentary canal is undergoing remarkable developmental changes. These changes are in anticipation of changes in the character of food which the growing system demands. The secretions of the digestive tract are no longer suited for the digestion of that food which alone constituted the diet of the child during the first six or eight months of infantile life. A mixed food is now demanded, and secretions are altered to meet the new requirements. We must remember, too, that not only the alimentary canal, but every organ in the body is undergoing a change; and that the nervous system, particularly the cerebrospinal system, is in a high state of functional activity wherein it responds quickly and in an exaggerated degree to an irritation which would go unnoticed at a less excitable period. If at this period digestive disturbances are brought about by improper feeding or if any departures from hygienic laws are permitted, it is not remarkable that the erupting teeth should be the scene of attack, neither is it remarkable that serious illness should result.

There is no doubt that the eruption of the teeth does, in some cases, create a disturbance. Neither is there any doubt that the disturbance would be minimized and in many cases go unnoticed were there no other causes at work at the same time to upset the delicate equilibrium of the growing child.

Aside from the long list of familiar symptoms coincident with and frequently attributed to the eruption of the first teeth, diseases of the ears and eyes occur with sufficient frequency at this period to warrant most careful examination of the mouth. The fact that many of these eye and ear symptoms clear up when the disturbing tooth is erupted or the gum properly lanced indicates the intimate relationship between these organs.

The teeth are so well recognized as sources of aural disease that it is only necessary to advise that in all cases of aural disturbance a careful examination of the mouth and teeth be made. I want to make an especial plea for the children in our public schools. It is estimated that one-fourth of all the ear aches among these children originate in or are continued by the presence of diseased teeth. These brave little stoics often suffer uncomplainingly, accepting their suffering as an act of God from which relief is not to be expected. Few of us have any idea of the bravery of these children in their struggle with ill health and pains, and I hope the day is near when we shall have provision made for the care of their teeth as a means of relieving suffering and preventing illness.

The disturbing influence of the first molars is not generally recognized and in the vast majority of cases it is of no importance. If, however, you find the child of five and a half is rather more fretful and cranky than usual; if you discover that sleep is disturbed and that the appetite is not up to the normal, an examination of the mouth will probably reveal a hyperemia of the mucous membrane in the molar region, and perhaps the cusps of the incoming tooth may be seen. Beyond the exercise of a little more patience with the child and a little more care in diet, treatment is rarely necessary. Occasionally, however, the irritation extends to the tonsils and fauces and a mild tonsillitis may result. Occasionally, too, a stomatitis may be set up that will not readily yield to treatment until the teeth are erupted. Less frequently the glands of the neck become slightly swollen. Just here a suggestion of caution might be made. If the swelling is coincident with the

eruption of these teeth; if the swelling is slight and no other evidence of tuberculosis is present, it would be well to defer operating on the glands until the teeth have come through and the mouth has returned to its normal state. It sometimes happens that the gland symptoms disappear with the eruption of these teeth and an operation becomes unnecessary.

During the following six or seven years of the life of the child the condition of the mouth and of the teeth is responsible, in a large measure, for the health of the child and its proper development. If the teeth are neglected during this period, loss of appetite, indigestion, ill health and an arrest of development which cannot be retrieved will be brought about by the inability of the patient to properly chew his food; while the absorption of vitiated oral secretions and the ptomaines resulting from food decomposition strongly predisposes to disease. A few years ago the writer had occasion to study the difference in virulence of certain pathogenic bacteria in different mouths and in the same mouths under different conditions. The results of those experiments, published three years ago, have been confirmed by further observation, and it may be accepted as proven that not only are bacteria found in greater numbers in uncared for and neglected mouths, but their pathogenic properties are greatly increased in such mouths. This may be explained by the abundant supply of nutrient media furnished by the lodgment of vast quantities of food in and about broken-down and defective teeth and possibly also by the altered secretions of the salivary and mucous glands. The pneumococcus is especially variable in the intensity of its pathogenic properties in different mouths and in the same mouths under different conditions, and the following facts, brought out in the experiments referred to, point to a possible means of reducing the number of pneumonia cases.

The bacterium is found in a large number of healthy mouths. The exact percentage of mouths in which the pneumococcus is present has been variously estimated and is probably not far from 15 to 20 per cent. In some cases the saliva containing the micro-organism is fatal to small animals, but too much stress must not be laid on this action, as other forms found in the mouth seem to have a similar power.

The organism loses its pathogenic property when grown on artificial media or when the nutrient medium is insufficient, but its

pathogenic properties may be revived by passing through susceptible animals. Few organisms are so easily destroyed by antiseptics as the pneumococcus. In the course of these experiments neglected and unclean mouths from which this organism had been obtained were thoroughly cleaned and the teeth put in good condition. For a period of fourteen days or more the teeth were kept scrupulously clean, with the result that in a majority of cases the organism disappeared altogether, and in the remaining cases its virulence was reduced and the saliva became non-pathogenic. This experiment is such a simple and practical one that it can easily be repeated in any dental infirmary with this and other bacteria. As a matter of fact, practically the same results were obtained with the aureus and other forms which were under observation, and the following deductions seemed warranted. Inasmuch as most disease germs enter the body via the mouth, and inasmuch as their virulence is increased when they find lodgment in diseased teeth or in the abundant food material contained in neglected mouths; inasmuch as cleanliness retards growth and reduces the pathogenic property of the bacterium when it does not actually destroy the organism, it behoves the physician and the dentist to regard the teeth and the mouth as important factors in diseases of bacterial origin.

The period between six and twelve years is a time when the teeth especially suffer and when they offer special opportunities for the reception of bacteria and the growth and development of the same. Caries in the first teeth proceeds with great rapidity, and these teeth receive little or no attention except among people of education and large means. Broken down crowns, diseased roots and suppurating inflammations lower the vitality of the child and render him an easy victim to the invasion of infectious disease. It is known that guinea pigs and other small animals fed on decomposing food or treated with purulent discharges are found to lose their resisting power to disease. Animals kept in pens near the opening of a sewer where the air is vitiated by the sewer gases are found to succumb much more rapidly when inoculated with pathogenic bacteria than animals furnished with a bountiful supply of fresh air, and there is scarcely room for doubt that a child forced to swallow the purulent discharges from an abscessed tooth or the ptomaines and toxins resulting from proteid decomposition is no longer able to offer proper resistance to the action of the disease.

Considering the number of contagious and infectious diseases which occur during this period, it is reasonable to believe that the state of the mouth and teeth has an important bearing on the development and spread of infection. Herein is disclosed a possible addition to our knowledge of prophylaxis and a method, still untried, of reducing the cases of infectious diseases in children. While little can be done at present to change existing conditions, except in that small proportion of cases in private practice which we have under our control, there is one phase of disease which occurs in both hospital and private practice which possibly might be improved along the lines indicated. Where one disease follows another, as where pneumonia follows measles or whooping cough, it would seem as if careful attention to mouth cleanliness during the period of convalescence might result in the prevention of many troublesome and dangerous sequelæ.

Reference has been made to the fact that suppurative discharges from temporary molars are frequent in childhood. It happens that the first molars, so often mistaken for temporary teeth and neglected, frequently break down and a suppurative condition follows. The absorption of pus from these teeth seriously affects the neighboring glands. In the superior maxillary region the parotid group is sometimes affected, but the submaxillary and superficial glands of the anterior triangle of the neck to which the lower teeth drain are more frequently affected. Enlarged glands occur in many cases without dental lesions, and there are a great many more cases of septic absorption from teeth than there are enlarged glands, but from the fact that the glands of the neck and the mesenteric glands are perhaps next to the lungs the most common seat of tuberculosis invasion, it is suggested that resistance to tuberculosis is lessened by the constant absorption of septic matter from diseased teeth. Moreover, many cases are reported of tuberculous glands of the neck where the tubercle bacillus was found in a diseased molar tooth, and we have strong presumptive evidence that in a considerable number of cases the infection found its way into the gland through a diseased tooth. (*British Med. Journal*, Aug. 20, 1904, p. 385.) Several cases reported in the *British Med. Journal* confirm this belief, as tubercle bacilli were found in the diseased teeth and in one instance in the abscess sac at the end of the root.

- In two cases which have come under my own observation the

bacillus was found in the putrescent pulp of the extracted molar, and there seemed to be little doubt that the glands had been infected through this channel.

Ordinarily the eruption of the second molars is unnoticed. In rare cases it may cause constitutional symptoms of a severe nature. This is more likely to happen where development of the jaw is tardy and where there is insufficient room for the eruption of the tooth between the distal surface of the first molar and the upright portion of the mandible. If from the tenth to the twelfth year you find the child suffering from fretfulness and loss of appetite, if the eyes and ears are irritated, if anemia with nervousness bordering on hysteria occur, it is just possible that an obstructed second molar is responsible for the symptoms described. An X-ray may be necessary to locate the tooth with accuracy and to make the diagnosis, and the treatment must depend on the condition revealed. I deplore most seriously the sacrifice of the first molars, yet it may be justified if we become convinced that there is no other way of relieving pressure. I wish to emphasize especially these cases, because they do not occur with any great frequency and few dream of the possibility of these teeth causing such serious illness. If you ever do meet with such a case you will be amazed at the improvement that will follow the relief of pressure.

Disease of the upper back teeth is so well recognized as a cause of empyema of the antrum that I will not dwell on this phase except to urge the greatest possible care in examination of the teeth whenever the antrum and associated sinuses are involved. The nasal fossa may also be involved in disease of the upper incisors.

The bacterium is found in a large number of healthy incisors. Inflammation extending from one of the third molar teeth or, indeed, from any of the back teeth has been known to give rise to inflammation of the nasal mucous membrane, and a discharge from the nose and catarrhal pharyngitis may be caused or continued by the irritation arising from a pulpless tooth. Hyperemia of the turbinated bodies and acute rhinitis may be greatly aggravated by an extension of the irritation from the diseased tooth.

Perhaps no one tooth is capable of giving rise to quite so many severe disturbances as those which may be set up by an erupting third molar or by the same tooth when inflammation and death of the pulp occurs. From the first condition, case after case of anky-

losis may be cited with intense neuralgic pains and severe tonsillitis as premonitory or accompanying symptoms. Inflammation extending along the Eustachian tube from this source gives rise to serious aural disturbances frequently attended with great pain. Unusual and often obscure ocular symptoms may sometimes be traced to this source, while constitutional disturbances are frequently of a severe and serious nature. Either from an erupting or from a pulpless third molar the formation of pus is always to be dreaded because of its tendency to burrow until some vital part is reached or because general septicemia with grave danger to life may result from the absorption of pus. Suppuration from a third molar should be promptly checked, even if it necessitates the loss of the tooth. Fortunately, the agency of the third molar in giving rise to disturbances in associated tissues is generally not difficult to detect, but it sometimes happens that an erupting third molar without giving great pain will produce enough irritation and enough pus will be absorbed to give rise to a chain of symptoms puzzlingly like the symptoms of a mild attack of typhoid. It may occasionally save great anxiety if the third molar region is carefully examined when obscure typhoid or malarial symptoms present themselves.

The action of pulp stones in causing intense pain is now generally recognized, though it must be admitted that the diagnosis is often extremely puzzling. It is safe to say that no diagnosis of neuralgic pain in any of the various ramifications of the fifth nerve can be made without a careful examination of the teeth. As frontal headache generally results from errors in refraction so pains which simulate facial neuralgia originate generally in the teeth.

The influence of erupting and diseased teeth in producing many forms of stomatitis must be passed over without consideration and many nervous reflexes which have their origin in diseased teeth must be neglected. Many other aspects of this subject will occur to the physician who follows this paper, but it is, perhaps, unwise to carry its consideration further.

It is futile, perhaps, to expect materially to restrict disease or render our environment innocuous. The laity will persist in uncleanly habits and will underestimate the value of hygienic living. Commercial zeal, the demands of society, the exactions of school and college and the complexity of life even for the very young will continue to prevent mouth cleanliness from receiving the attention it

merits. The self-satisfied physician and the indifferent dentist will continue to neglect this and other forms of prophylaxis, yet the true professional man will always find his greatest satisfaction in the prevention of disease; and it is to him that an appeal is made to practically test the efficiency of the suggestions made in this paper.

If the inspection of school children could be made to include an inspection of their mouths it is believed that a marked improvement would be noticed in public health; and if the knowledge that mouth cleanliness is a potent factor in restricting disease could be made known it is believed that intelligent and progressive people would avail themselves of this knowledge as a protection to health.

*DISCUSSION.* Dr. Thomas Morgan Rotch, Boston, said that, with regard to the question of the first molar and its development, he believed in a large degree that those tendencies which develop at this period—many pathologic in character—are simply coincident to a molar appearing at that time. The real trouble lies behind and beyond. In the first place, prenatal tendency to want of development, lack of room, begins to be noted at this period because the other unerupted teeth at this period lie in many different positions, because their change of position in the course of eruption is remarkable. Crowding is manifest in the direction of least resistance, which is naturally on the side nearest. At about this period the child begins to be a mouth-breather, and adenoid vegetations make their appearance, also the result of degeneracy, but aggravated by the fact that there is lack of breathing space, want of oxygenation and the fact that the child finds it necessary to breathe through its mouth. This brings decreased resistance to infection, impaired development of the body generally, particularly in the direction of the bronchi and lungs. Not getting the amount of oxygen necessary, there is a decrease of resistance in this direction, and he believes that at this period chiefly is laid the foundation for great susceptibility to tubercular infection. So far as the pneumococcus is concerned, he agreed with the position of the essayist, and cited as a good example the fact that we do not have pneumonia and bronchitis following the administration of ether as much as we used to. He believes that this is largely due to proper disinfection of the mouth. Again, we do not have pneu-

monia following scarlet fever, etc. Those who had necrosis as a result of one of these diseases were usually people who were treated under the old methods. Since mouth-breathing has been treated in hospitals there is very little of it. Dr. Rotch emphasized the point that there is little or no treatment that will benefit these patients at the time of the eruption of the first molar. If those little mouths were spread out at this period relief could be given which would be pronounced and real and much more effective than expansion of the arches after the teeth have erupted. What is the use of waiting until there is a narrow arch? Why wait until all the surrounding sinuses have narrowed and become deformed? Direct relief can be given by application to the arches because they widen easily at the median suture, and this gives definite benefit. This not only helps the eruption of the first molar, but lays the foundation for the eruption of the second and third molars.

*Dr. M. I. Schamberg*, Philadelphia, mentioned the case of a patient who had been suffering from tinnitus aurium and treated by a very able ear specialist in Philadelphia, and who was subsequently sent to him to search for the dental cause of her trouble. Though she had but a few teeth on the affected side, he decided to take a radiograph of several upper teeth that were loosened with pyorrhea, and the picture showed distinctly a communication with the pyorrheal pockets from a small opening in the floor of the antrum. On the removal of those teeth and the syringing of the antrum the ear symptoms were at once relieved.

*Dr. Alice M. Steeves*, Boston, said that parents should be educated as to the well-being of the child. While approving all that is scientific and broad, physicians must go back to the primary cause of the trouble, the care of the child's mouth from the beginning. It is necessary to teach the mother how to clean the child's mouth. Many physicians are too anxious to save their time and turn it to financial profit. They do not seem to consider that teaching the patients and the prophylaxis thereby secured are the elevating things in the profession. Educate the people to appreciate their general health and we will get better results accordingly.

## ARE WE RIGHT OR WRONG IN THE TREATMENT OF PUTRESCENT PULPS?

BY E. M. KETTIG, D.D.S., LOUISVILLE, KY. READ BEFORE THE KEN-  
TUCKY STATE DENTAL ASSOCIATION, AT LOUIS-  
VILLE, JUNE 13, 1906.

As the title of this paper is an interrogative one, it would only be right in my listeners to assume that they are not expected to learn anything new from what is here written, but, on the contrary, as the writer is doing the interrogating, they are appealed to in an effort to explain the best of two treatments for putrescent pulps. In my opinion, there is nothing in our profession so tedious to do, so uncertain of results, so exasperating at times, so distasteful to the most of us, so repulsive to patient and operator, as the raking out of the old, fetid, odoriferous, putrid remains of a deceased pulp and the consequent poking and pushing of a devilish little broach in the tortuous and winding canals of a molar. O! Could there be anything more fiendish in nature, more exasperating in accomplishment, than to try to even find an old seemingly obliterated and out-of-the-way root canal, say, when the thermometer is one hundred in the shade, the tooth a second or third molar, the patient scared to death (almost), the mouth one of a "sucker," and two or three victims waiting for their turn next, and both telephones and the door bell ringing at the same time? O, joy, buckets of joy, surely you are wanting just at this critical time! But enough said of this sweet reminder; let us say more about the questions we want to ask.

The most of us have been taught, I believe, that in treating putrescent pulps the thing to do is to gain an opening into the pulp canal, and by instrumentation, irrigation and medication remove the pulp remains, dry out canal, dress tooth with some application, having one of the essential oils as a base. Carbolic acid is pumped into the canals by quite a few, while clove oil, eucalyptus, and, in fact, many of the well-known dental remedies, are used. When sinous openings occur, discharging upon the gums, it is recommended that these agents be pumped through the canal into the abscess tract, and out through the sinus until an eschar appears. The treatment I am so superficially outlining is so familiar to the most of you that it needs but little mention. It is as old as dentistry itself, and with it many teeth have been saved

and many have been sacrificed, many have kindly yielded to treatment, and many have refused to budge.

In the last few years some of our most eminent men in the profession have read papers before our national societies condemning this old treatment upon which we were all raised, saying that the oils coagulate albumin, as well as other fluids found in root canals, causing insoluble masses, further saying that it was not good practice to use any medicinal agent that would not be soluble in water. Now we know the essential oils (our sheet anchors) do not mix with water, hence are contraindicated according to this new teaching. Our successes are supposed either to have been accidents, or due to the tolerance of the periodental membrane.

In the treatment of this class of cases, with a non-coagulating agent, one soluble in water, formaldehyd has been extensively tried, but its irritating properties forbade its free use until there was placed on the market the solidified variety, which is now claimed as a specific in putrescence, and when used as directed is said not to be irritating. I have used the solidified formaldehyd quite extensively in the last few months and I must say it has been with the most gratifying results. Its application to putrescent pulps or any other condition accompanying death of the pulp is a simple matter. It is recommended that the pulp chamber be opened, the canal or canals cleaned by instrumentation, but not dried, then a small bit of solidified formaldehyd be placed within the bulbous portion of pulp chamber and cotton placed over that, then the cavity sealed with temporary stopping. I have found it seldom necessary to repeat the treatment. It is said that formic aldehyd gas is evolved, permeating the tubuli of the tooth through dentin and cementum, and beyond, through apex of root of tooth, tanning the protoplasm of every pathogenic germ and sealing its inclosed nuclei forever, preventing proliferation. Now, if it will do all of this, as claimed, it seems to me we have indeed a specific and it ought in a short time to revolutionize all former treatments of pulpless teeth. In our practice, as we drift along through time, we are attracted by many different methods, think much of them for a time, laud their merits highly, then abandon them just as suddenly as we took them up. In my own practice I used to think iodoform indispensable in my category of dental medicines, but I have not used it in years. I do not use nearly so much

arsenic for devitalization as formerly, although I have taken out many more pulps than formerly, and now I seldom use any of the essential oils upon which I was raised, and would never have dreamed that they should not be used in treatment of pulpless teeth.

Now that I have briefly outlined widely different modes of treatment for putrescent pulps or kindred ailments, I am again going to ask—which is correct and will give the best results with the least possible difficulty in treatment? Can it be possible that practically the whole dental profession has been wrong for years in the use of insoluble remedial agents, medicines that are not only insoluble in water themselves, but make, by coagulation, insoluble fluids and semi-fluids in the teeth themselves? Whether or not it is right to drop the old and tried remedies and abandon all our former *materia medica* for a comparatively new method and remedy is questionable. I have (at times) treated by the old way teeth for days and weeks, and in some cases for months, without success, whereas with the solidified formaldehyd it is claimed that, regardless of the stage of inflammation in which the tooth and its surroundings are, one application and possibly two will completely cure the case. Another desirable feature about the newer method is that one may with impunity seal the cavity with this treatment and, in fact, must do so to receive the benefits of volatilization, whereas, in the old way there would develop a smoldering volcano if an attempt was made to seal the tooth. How many acute abscesses have been started by the first treatment in the old way, and the patients return the next day with very swell affairs? This does not exist with the new way. If any of my listeners have tried the solidified formaldehyd and can enlighten us as to its merits in the discussion I feel that such discussion would be of some good to the most of us.

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CONTROLLING ALVEOLAR HEMORRHAGE.—Soften guttapercha and press it into the alveolar socket with a considerable excess. Have the patient bite into it to occlusion, and force the excess against the buccal and lingual surfaces. Take out and cool and trim away such portions as are not needed, and make smooth. Replace and let the patient hold it in place by closing the teeth. It makes an effective mechanical plug, which may be of use in retaining medicinal agents.—DR. E. A. BOGUE, *New York*.

## Digests.

THE TECHNIQUE OF MAKING A PORCELAIN INLAY.  
By G. F. Woodbury, D.D.S., Cleveland, O. I have tried to make this paper practical, and have gone into details that the experienced porcelain worker may consider unessential; but this paper is for the inexperienced operator—the beginner—especially for the one that has not begun, and I have labored to make plain the steps in the construction of a porcelain inlay.

The illustrations used are crude, but they are employed to make the text clear. I make no claims to originality, but present the subject as I practice it in my office. Many things have not been touched on that have an important bearing on porcelain inlays, because they do not directly relate to the subject presented in this paper. The various methods used for the same purpose have been ignored, because, for me, the ones presented are the most satisfactory. The presentation of other methods is left to those taking part in the discussion.

In making a porcelain inlay it cannot be said, as it is of a gold filling, that when the cavity has been properly prepared that the foundation is laid for a successful operation. While the cavity form has much to do with the success of a porcelain inlay, it is not the most important part. Indeed, it is impossible to say which is the most important part of the operation. Essential as the formation of the cavity is, I do not deem it necessary to take the time to go into the detail of its construction. But before dismissing the subject of cavity preparation, I wish to lay before you this fact: Porcelain has not come to stay, if you depend on the cement to keep it in the cavity; the cavity must have a broad, well-defined seat, not for the convenience of guiding the inlay to place when cementing it in, but for the purpose of providing adequate resistance against the stress of mastication. (Fig. 1.)

Nor will it be to our advantage at this time to discuss in any way the relative values of high and low fusing porcelain, the use of the pyrometer or where porcelain is indicated, but confine ourselves wholly to the technique of making a porcelain inlay.

If we are to consider consecutively the technique of the operation we must take as the first step the matter of separation. If

you think it requires more space for the placing of a porcelain inlay than for the insertion of a gold filling, you are in error, for it is only necessary to have the platinum extend over the labial surface (if the inlay is to be inserted from the lingual side) the width of the space between the teeth; all that is required is to have the matrix extend beyond the edge of the cavity, so as to have a well-defined margin. But if it is a cavity involving the incisal surface, the matrix can have wider margins, although it is not necessary. (Fig. 2.)

That we may get a better understanding of how to construct an inlay, let us consider a definite cavity, one involving the approximal and incisal surfaces of an upper central incisor. (Fig. 3.)

#### TAKING THE IMPRESSION.

Having gained sufficient space and prepared the cavity, the next step is to obtain an impression, for I am convinced, after repeated

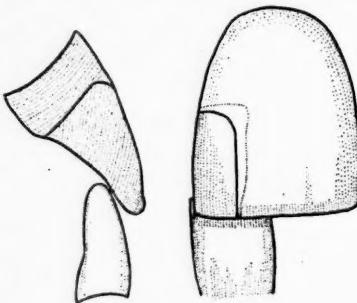


FIG. 1

failures to procure a good matrix, that it is necessary to have a cement impression of the cavity, not for the purpose of swaging the matrix, but for the convenience of roughly shaping the platinum to the cavity-outline. To obtain this cement impression, I place a napkin in the mouth so as to exclude the moisture, wipe out the cavity with cotton, mix the cement quite thick, take it between the thumb and fingers and make it into a ball, then roll it in talcum powder to prevent it adhering to the cavity walls. It is now carried to the tooth and worked into the cavity. When the cement is hard, trim away the excess on the labial portion to the margin of the cavity. Then, with a little pressure, the impression will be easily removed. For the convenience of holding

the impression it is fastened to a piece of modeling compound. Now place a piece of platinum over the impression and a piece of wet spunk over this, and with a suitable instrument work it down till it gives a fair outline. (Fig. 4.)

I am sure you will readily see the advantage of the impression; and you must acknowledge that it is easier to form the platinum over a rounded surface than it is to force it into a hole. It takes time, however, to do this, but in the end it saves time, prevents punctures, eliminates expletives and enables you to get a better matrix, because there are fewer folds to burnish out. And when the cavity extends to the gum-margin at the gingivæ you can trim and bend your matrix so it will readily slip upon the gum.

#### OBTAINING THE MATRIX.

We now take up the most difficult part of the operation—to obtain an accurate matrix. You must be equipped with suitable in-



Fig. 2



Fig. 3

struments and fortified with an abundance of patience. After your matrix has been outlined on your cement impression, place it in the cavity, working it to place as near as possible; then use small pieces of wet spunk, filling the matrix, and with a suitable instrument force to place. When it is firmly seated, the edges of platinum can be pressed down with the finger or a burnisher. Now remove the spunk, and if the matrix is well in place, put a piece of linen tape wide enough to entirely cover it, and burnish your margins. If your cavity has been formed with its walls at right angles to each other, it will be necessary to have an instrument that will adapt the platinum to these angles. (Fig. 5.) For this purpose I made some instruments, the only original thing I have to present except the use of the tape for forcing the inlay to place when cementing it in. This will be spoken of later.

The instruments are made by soldering a piece of pure gold

to an old excavator handle, suitably bent, and shaped as you find it necessary. The ones used in adapting the matrix to the angles are inverted pyramid shape. Hold the matrix in place by a bursisher and use an inverted pyramid instrument to press the platinum into the seat and labial resistance groove. The matrix may be removed and annealed, preferably in the furnace, before the last burnishing. When the matrix is as good as you think you can get it, take a piece of gum camphor a little larger than the cavity, and force it into the matrix and burnish toward the margins, using considerable pressure. You can now use no little force to dislodge the matrix without distorting it. Having removed the matrix with the gum camphor in it, place it on anything that will support it (I use an inverted glass salt dish), place a drop of alcohol on the camphor and touch a lighted match to it.



Fig. 5

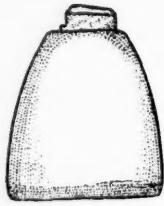


FIG. 4

In a few seconds all trace of the camphor is gone and your matrix is clean and bright. If any blood has got on the matrix there will be a black stain left, but do not try to remove this—it will disappear with the first baking and not injure the inlay.

#### SELECTION OF SHADES.

We have now come to the part in the operation that requires an artist's eye, aided by a good light—the selection of shades. It is important to make the selections before placing the rubber-dam, if you use it, while preparing the cavity. It is necessary to use two, and sometimes three, shades in such cases as we have selected. First, draw a diagram of the tooth. (Fig. 6.) Now take your shade guide and select the shade at the upper portion of the cavity; it is B; mark this on your diagram. Now determine how far this shade extends, and draw a line on your chart. Follow

this plan until you have completed the selection. Dentin is almost always a shade of yellow; determine whether this is light or dark, and note this on your chart also.

We are now ready for the furnace. Opaque lining is used in the first baking. This "lining" is very high fusing and serves two purposes: one to control the shadow and the other to keep the matrix from warping. Hold the matrix with suitable lock-pliers, taking hold of it where it will be least liable to bend, and place the lining in the matrix; absorb the excess moisture with white blotting paper. Jar the pliers to settle the body into the matrix. Do not allow the porcelain to come to the margins. We are now ready for the first baking. If there is a puncture in the matrix there will be no harm unless it is on the margin, then it will be best to get a new matrix. Do not place anything over the

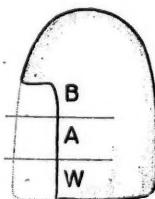


Fig. 6

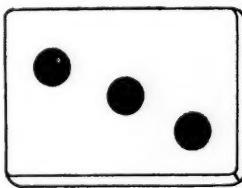


Fig. 7

opening—the "lining" will not go through. Cut the porcelain where there is much bulk, to prevent it drawing the matrix when the porcelain shrinks in baking.

#### BAKING.

In baking the inlay I consider it necessary to rest the matrix on a bed of powdered silex instead of on a bare slab. This is a reasonable conclusion, because it is better to have the entire surface of the matrix supported than to have it rest on two or three points. This will prevent any change in the matrix when the platinum is at an intense heat and the bulk of porcelain weighing down. This is, I consider, an indispensable precaution if you want good margins.

It is not necessary to replace the matrix in the cavity and burnish after first or subsequent bakings. The lining body should be

baked to a full glaze. Next the foundation body is added; build it out so as to reproduce the dentin. Fuse this to a light glaze. Now we are ready for the enamel bodies. First, arrange the porcelain on a glass slab of generous size, so the shades can be kept separate. (Fig. 7.) This should be done in the order in which they are placed in the matrix. Place the bottle showing the letter back on each portion. Make the arrangement in the same order each time, then you will not get confused in your shades. Place before you the chart made when you took the shades as a guide in blending the colors. At this point in the procedure you are called on for something more than the skill of a mechanic; it is the place to show how much of an artist you are. The matrix has now been well supported by the "lining" and foundation body, so there is little danger of distorting it. But even so, do not use too much body at a time in order to hasten the operation. It is more profit-

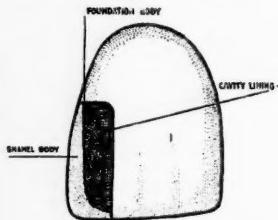


Fig. 8

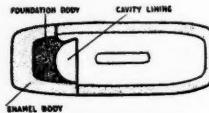


Fig. 9

able to make a good inlay in an hour than a poor one in 30 minutes. In applying your shades, start at the upper part; do not use too much porcelain nor build it down too far. Then add a little of the next shade and a smaller portion of the next shade at the incisal edge. Clear your margins with a brush; fuse to a full glaze. Now the incisal edge is well protected. For the next baking a larger quantity of body can be added. Watch the blending of the shades. Take particular care to keep the porcelain body from overlapping the margins so as not to form a feather edge. After the final baking allow the piece to cool off gradually in the furnace, in order to temper the porcelain. (Fig. 8.) To my mind, the arrangement of the porcelain bodies as used here is the only scientific way to construct an inlay. Here we have three distinct bodies. (Fig. 9.) Each has a different fusing point. The first,

opaque body,  $2300^{\circ}$ ; next, foundation body,  $2210^{\circ}$ , and the last, enamel body,  $2080^{\circ}$ . By this arrangement it will be apparent to you that the last baking will not disturb the first body used. But when you use throughout your inlay a body that has one fusing point and only biscuit the first part and glaze the last, I do not see why there may not be some change, and draw the matrix out of shape.

Before removing the matrix place it in the cavity and see if you have the right contour. If it is correct, strip the platinum from the inlay by first pulling it back from the edges and carefully working it off.

Now comes the most exquisite time in the operation. You feel as if you had heart trouble—a “fluctuating fever;” your temperature is up; now down. No doubt the sensation is like that ex-

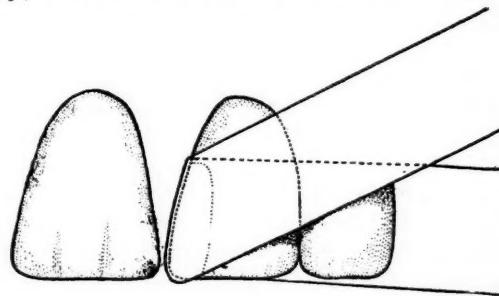


Fig. 10

perienced by the speculator when playing the market and has staked his last dollar on the next quotation, and it is to make his fortune or bring him ruin. Will the margins be good? The color? Whew! The patient holds a towel so as to catch the inlay if it drops, and with thumping heart and trembling hand you slip the inlay into the cavity. The shade is fine! The margins excellent! You are about to give a war-whoop, when you remember you are a dignified professional man. The desire is strong, however, to go into the laboratory and execute a jig. But there is a letting down; you feel as if you had awakened from a delightful dream and reach the point where you realize it is time to get the inlay ready to cement in. First it must be etched. Take a piece of base-plate wax and shape it into a cone; then warm the apex and imbed your inlay. Be sure the margins are covered with

wax, and then apply hydrofluoric acid with a piece of wood. Cover the surface thoroughly and let it stand two or three minutes, then remove the acid with water and a brush. After removing the inlay from the wax, put a little alcohol on it and use a small brush and thoroughly remove all white powder. This is important.

If all the other steps in the operation have been well executed, the inlay may be spoiled in cementing it in.

#### CEMENTING THE INLAY.

I have never found it necessary to use more than one shade of cement.

Place the napkin in the mouth. Wipe out the cavity with cotton. Arrange a generous amount of powder and liquid on a glass slab. A bone spatula must be used. Take a piece of linen tape eight inches long and half an inch wide, and place it where it can be taken up quickly. It is a convenience in handling the inlay and easier to place it if you will attach it by varnish to a wedge-shaped piece of orange-wood. Everything must be ready because you must work fast; there is no time to hunt for instruments or pick up the inlay two or three times, or the cement will harden before you can get the inlay to place. Mix the cement as thick as you can and be sure the inlay will go to place. Place the cement in the cavity with a small instrument, like a canal plugger, bent at an obtuse angle. See that the cement covers every wall, is in the seat and over the margins. Now insert the inlay, and with the tape between the teeth (Fig. 10), force the inlay to place with a drawing motion that will press it into the resistance seat. Hold this for 10 minutes. The tape does two things; it gives equal pressure on all parts of the inlay, and wipes the joints free of excess cement. I consider this last point an important one, because it is better to have the cement harden with the natural gloss to protect it than to leave an excess over the joints and cut it off after it has hardened. For when you try to cut it off with disk or stone there is going to be a breaking of the cement away from the joints which will extend below the margin.

When the tape is removed, varnish the joints. If the linen tape is too thick use strips cut from architect's cloth; this is thin and very strong.

The inlay may not be as good a shade as it was before it was

cemented in, but when the cement matures and washes away from the margins, there will be a great improvement.

In conclusion, let me repeat the injunction I laid before you in the opening paragraph, because I consider it the fundamental principle, one you must have ever before you in successful porcelain inlay construction. If you forget all else I have said, remember porcelain has not come to stay if you depend on the cement to keep it in the cavity; the cavity must have a broad, well-defined seat, not for the convenience of guiding the inlay to place when cementing it in, but for the purpose of providing adequate resistance against the stress of mastication.

*DISCUSSION. Dr. Price:* This question of porcelain fillings is too large to discuss here in detail as we would like. There are, however, two or three great principles underlying this work that we have to recognize.

In the first place, to make a perfect porcelain filling we must make a perfect (as nearly perfect as possible) fitting matrix, and we must reproduce the color of the tooth with our restored part. That does not mean merely to make the porcelain the same color as the tooth, but to make a completed operation, which, after cementing, will have the color effect. That brings in the great problem of the relation and position of the different colors. We may be able to make a relatively perfect impression, but let us understand that after we have taken the impression, we have several opportunities for spoiling its shape—first, by the tension of the matrix in annealing. The doctor suggests that it be annealed once before the final burnishing, which I think is not enough. Every time we burnish we have produced that condition in the metal which makes it necessary for us to anneal again before the metal will relax.

The man who makes the most perfect-fitting inlays is going to burnish his margins several times and anneal frequently. Experiments illustrate the warping of platinum due to heating and annealing, and show a warping of one-eighth of an inch in three-quarters of an inch.

Another reason for the change of the shape of the matrix is in the fact that any substance that has high specific viscosity and a great deal of adhesion has a great deal of power when shrinking. A viscous substance, like molasses, will make paper curl up when

you put a drop on it, simply because the surface tension of that liquid is greater than the resisting force of the paper. Now, when we heat porcelain it becomes a viscid liquid, and it adheres tightly to platinum and contracts and shrinks markedly on cooling. Every time we fuse porcelain on a piece of platinum and allow it to cool, besides shrinking, the porcelain will assume a spherical shape, which will tend to curl the platinum, as the porcelain will not stretch or check. How are you going to stop the distortion? When a man undertakes to build a structure of iron, to have the greatest strength and the least weight, he generally makes what he calls an angle, a thing we do by leaving as wide a marginal overlap of platinum as conveniently possible.

My own method is to reburnish my matrix into the cavity with soft metal or wood point, and use just as much burnishing as I want to, fully expecting it is going to warp some in annealing. Each time, because of less burnishing, there will not be nearly as much relative distortion of the matrix. After annealing several times, I put in my first mass of material. One or two of our leading porcelain operators put shellac on the matrix, in order that the porcelain may pull away from the platinum and not distort it. Use simply enough porcelain so that the resisting strength of your platinum will be relatively greater than the warping strength of the porcelain. There are so many phases of this that we will have to pass some important steps.

I want to speak of Dr. Woodbury's method of taking an impression of his cavity from which to make or start the matrix. There are two reasons why I do not do so. It takes 10 or 15 minutes for the cement to get hard enough so that you can work on it. In that same length of time you can get as good an impression by directly burnishing it in the cavity, as that impression will produce and without doubling.

Have you ever been in a spinning factory and watched them spin brass? They start to work from the center and not vice versa. We should proceed in the same way to burnish the platinum over the margins. Be sure to do it in a way that you will not get a wrinkle. For my part, a filling is a failure if I have three thicknesses at one part of the matrix.

Now, regarding the use of different kinds of porcelain in the same filling.

The unit of shrinkage for a low-fusing porcelain is entirely different from that of a high. The strength is greater where one kind of porcelain is used than when we use two or several.

When you put white material, like opaque lining, under porcelain of any color, you have in proportion to the translucency or transparency of the porcelain a mingling of the lower color with the upper color, and the effect is the same as if you cemented it in with a cement as white as that lining. The question of using the perfectly white matrix lining involves the necessity of overcoming the whiteness by the colors used above it, and that becomes possible relatively in proportion to the thickness that you have to work on. In shallow fillings it is almost impossible to kill the white color and bring the natural color of the teeth.

Bake a piece of brown porcelain onto some of the lining material and you will see the color is entirely different. How are we going to overcome the color problem? Only by comparison or imitation of effect. I was surprised to read in Dr. Woodbury's paper that he used only one color cement for all conditions. In effect the cement is simply a colored curtain hanging through the mass which interferes with its transparency and translucency. Can we prevent putting that curtain in the mass of the tooth? No, we have to have it there. Then we must imitate the natural color effects by modifying these conditions, which will involve changing the position and angle of the margin, the color of the curtain and shape of the angle, as well as the color of the porcelain.

*Dr. Dinsmore:* Dr. Price lays a great deal of stress on the shades of the cement. I fail to see the marked effect of the different shades of cement that he does. I use the different shades to the best of my judgment, but I would like to know in how many cases he could distinguish or name the shades used after they are cemented in, if he had a chance to examine them. I do not believe that he could come very close to it.

*Dr. Wasser:* I start with a good-sized piece of matrix material and burnish it to margins and then burnish it down into the cavity. I use a diamond disk instead of hydrofluoric acid for etching.

*Dr. Burt:* Get the margin absolutely clear and sharp before any pressure is brought to bear upon the matrix on the deep-

seated part, remove the matrix after first burnishing, paying very little attention to whether it is cracked or split, as it takes a very large crack to make any difference. I have discarded hydrofluoric acid, and generally make a cross section of cuts with the diamond disk, whether the inlay is large or small, but it is rather difficult with small inlays.

*Dr. Wilson:* As the amount of cement between the tooth and the inlay can be very thin, it seems to me that the pure white cement would not be objectionable.

*Dr. Price:* You take the best ground glass stopper bottle and put cement on the stopper and replace it in the bottle and you cannot see through it. If you put water in it you can see through it. That little thin layer of cement will be sufficient to make it entirely opaque. You could put the cement on one part of the inlay and not on the other. I would not try to put more than two colors of cement between my porcelain and tooth. I would do that in this way: You put a little of the color you want next to the gingivæ on the tooth and a little on the inlay, and have just as small a mass as you like, that is, enough to give the color to that part, then flow the rest right over that and it will have no effect on the color you put on first. It is very simple and very effective.

*Dr. Stephan:* The question of shrinkage is of great importance. We ought to follow one of the suggestions of some of the old-time porcelain workers, and not bake the inlays to a full glaze, for thus will there be great shrinkage and stress brought upon the layers.

We overbake the porcelain if we carry it to  $2300^{\circ}$  every time. It does not have the quality that it should have.

We are doing much better work now than we ever did before, but we are not doing any better work in proportion than the men who did their work years ago. That ought to make a plea for ideals. I am satisfied with inlays so far, and the next one I want to make better. Let us try the careful burnishing of the matrix and getting rid of this shrinkage, and in that way get better inlays. Experiment a little and see.

*Dr. Kenyon:* I do not see wherein any harm can be done by putting an inlay back into the cavity and burnishing the matrix

after the first and second and third bakings. I believe it is good practice.

All the inlays I have seen which, after being etched, had come out had the cement sticking to them. The cement had let go the cavity wall. The margin of an inlay should be waxed thoroughly before being subjected to hydrofluoric acid. If one does not get rid of the acid he will have trouble. An inlay so etched should be washed in carbonate of soda, then brushed in running water and with alcohol. The soda will remove the acid from the inlay.

*Dr. Barnes:* I believe we may use a thick platinum with better results. I have taken a piece of platinum which has been used and refined it and put it through the mill and made it as thin as I could make it. I still cling to my idea of the photographic film for burnishing the matrix to the cavity. It is strong and tough and conforms to the shape of the tooth and the inlay when you are placing it in, and you can also see through it and see what you are doing.

*Dr. Ebersole:* I burnish the matrix into the cavity direct. I use in that case the architect's linen or linen tape and do not place the burnisher upon the metal directly at any time. I believe that it is necessary, particularly in large cavities, to frequently anneal and burnish the matrix. In making a matrix, I use the tape and burnish into the cavity, paying little attention to the margins. After burnishing, I reanneal my platinum and then burnish, and use a piece of rubber-dam over the margin in the place of the tape for the last burnishing. Get as wide a margin as possible. Of course, there are cases in which we cannot have a wide margin, and in those cases burnish and trim the matrix. Someone suggested the use of an orange-wood wedge, but I prefer pine from ordinary matches.

I agree with those who say they like to have different color cements. I am not of the opinion that the white cement is at all desirable. I very frequently mix two or three colors of porcelain to procure the proper shade. I make a mix of what I think, from past experience, will produce the shade I desire; one part of A, three of B and one of C. Then I mix the three colors together and make a bake and see how closely that corresponds to the shade of the tooth. If it is not the shade, I again make a mix in

different proportions and again bake until I have obtained a shade that corresponds as closely as possible to the shade of the tooth, and use that. I think that the last bake should be the glazing bake.

*Dr. Woodbury:* Dr. Price has not proved anything by his experiment, except to show us what we already know, that porcelain shrinks in baking. The margins of a matrix are bent so as to form a rim, and that strengthens it so there is little or no chance for it to warp. A thin piece of platinum bent on itself, as Dr. Price has shown us, of course will warp; it cannot help changing when it is heated because there is no rim to stiffen it. And Dr. Price's other experiment has little practical value. One would not put a great mass of porcelain body on a thin, straight piece of platinum and expect no change in shape. There is not one of you that would bake an inlay as shown in the experiment, even with the margins of the matrix stiffened with the rim; you would use a small portion of body and cut it to prevent it from drawing the matrix out of shape when it is fused, until the matrix is sufficiently strengthened.

In the use of the tape, someone speaks of the danger of displacing the inlay. Always draw the tape toward the resistance seat. If it is put in from the labial side draw it lingually. I do not think that it is necessary to be able to see your inlay as it goes into place, when you have a definite place for it to go. When the margins are well covered with cement, I do not see how you are going to see them anyway.

Dr. Stephan speaks of using a small amount of cement. You can only get into the cavity so much cement, anyway. You have to have a good excess so it will come over the margin. Some question has been asked in regard to the burnishing—not putting the matrix back after the first baking to burnish it. If he can produce his results with the methods he uses, that is good, but I discarded that practice because I failed to get good margins by doing it. I have come to the conclusion that it is not necessary. That is the reason that I do not burnish after the first baking.

I would use a cavity lining for the purpose of strengthening my matrix. Then I use the foundation body over that, so that there is not so great a difference in the fusing points between the opaque lining and the enamel body, so there may not be the cracking

and breaking away as shown in the experiments. I do not necessarily use the foundation body to reproduce the color of the dentin. I have made some porcelain inlays in which I baked the enamel body on the cavity lining, and I found a weakness at the junction of the enamels. In baking an inlay, it is better to let it come to its fusing point slowly than to push it as rapidly as possible. I allow most of the glow to get out of the furnace before removing porcelain after fusing. The porcelain would not check if taken out just after it is fused, but I believe we have a better porcelain when we do not expose it suddenly to a very great change in temperature.—*Dental Summary.*

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THE UNITED STATES PHARMACOPEIA. By J. P. Buckley, Ph.G., D.D.S., Chicago. In reading the dental literature as it appears in the journals from month to month, I am deeply impressed with the fact that it is quite essential that some of the members of the profession keep arousing interest in the subject of "Dental Medicine," in order that this field may keep pace with the other rapidly developing branches of our calling.

Therefore, in this article I shall assume the responsibility of calling the attention of my readers to the subject of the United States Pharmacopeia, and especially will I try to emphasize the more important changes, to us as dentists, in the last edition, which is the Eighth Decennial Revision of this work.

The first Pharmacopeia for the United States of America was published at Boston in 1820. This edition appeared in both the English and Latin languages, according to a draft indorsed by a convention of representatives from the medical colleges and societies held in Washington, D. C., that year. Revisions have been made each succeeding ten years, the last being made in 1900, the publication of which became the official standard September 1, 1905.

The Pharmacopeia may be defined as an authoritative work which (1) establishes *standards* and *tests* for the identity, quality and strength, and (2) gives *directions* for the preparation, purification and preservation of drugs and medicines. To prepare, purify and preserve drugs and medicines is the legitimate business of the pharmacist; but every dentist should at least be fa-

miliar with the standards and tests for the identity, quality and strength of the drugs and medicines used in his daily practice.

It would be quite impossible, in the space allotted to me, to discuss all phases of this subject; therefore, in this article, I shall confine myself largely to the changes in the last edition, a knowledge of which is of the utmost importance to every practicing dentist.

An important change in the seventh (1890) edition, which has also been adopted by the eighth (1900), and which, judging from the expressions in our current literature, is not fully understood or appreciated by dental writers is the *nomenclature*.

#### GENERAL NOMENCLATURE.

The nomenclature is alphabetical throughout; and in it can also be regarded the descriptions of the article according to their derivation.

#### CHEMICAL NOMENCLATURE.

The English titles and names of chemicals are reversed, i. e.: Sodium chlorid instead of chlorid of sodium; magnesium sulphate instead of sulphate of magnesium, etc. This is in accordance with the formula for the various chemicals and should be remembered; for to name chemical substances without designating them in correct chemical terms is both unscientific and misleading. In this connection I will say that it is to be hoped that such expressions as "lime salts," instead of calcium salts, so frequently appearing in our literature, with reference to the chemical composition of teeth, may soon be relegated to medieval literature. There is a constantly increasing list of chemicals coming from the synthetic laboratories, many of which have been recognized by the Pharmacopeia of 1900. It is not always practical to designate these substances by their complete chemical name, owing to the complexity of the molecule. The official title of many of these has been formed by contracting the chemical name, as will be noticed later when I call attention to *new articles added*.

#### BOTANICAL NOMENCLATURE.

The general rule in the nomenclature of articles of botanical origin, is for the Latin title to be the *genus* name of the plant. For example, the United States Pharmacopeia recognizes two varieties of cinnamon: *Cinnamomum Saigonicum* (*Saigon cinn-*

mon), a species cultivated in the neighborhood of Saigon, the capital of French Cochinchina, and *Cinnamomum Zeylanicum* (Ceylon cinnamon). The official Latin title for both species is *Cinnamomum*. There are several exceptions to this rule, however. One notable exception is found in naming the leaves of *Erythroxylon Coca*, whence that valuable alkaloid, cocaine, is obtained; for instead of calling this article *Erythroxylon*, it is officially designated *Coca*. It is true that the early generic names of plants were selected rather arbitrarily, yet the differentiation of their species is almost invariably indicated in their specific names. Some of the native plant names, however, lead to great confusion, as, for example, *cocoa* (*cacao*), *coco* (*nut*) and *coca*, three separate and distinct plants. When von Humboldt discovered the chocolate nut he named it *Theobroma* (God's drink) and *cacao*, after the native Indian name; but it has always been confused, because of the similarity of names, with the *Cocos nucifera*, the milk-bearing cocoanut; and by many to-day the oil of *Theobroma* is called *cocoa-butter* instead of *cacao*.

#### PHARMACEUTICAL NOMENCLATURE.

The Pharmacopeias are the legal authorities for medicines in their respective countries. This gives to the nomenclature of pharmaceutical preparations a significance scarcely realized; and, I am sorry to say, little appreciated by dental practitioners in general. As a result of this lack of appreciation on our part, manufacturers of proprietary dental preparations are thereby enabled to palm off on the profession, under captivating and misleading titles, preparations, by far too many of which are of doubtful composition and questionable therapeutic value. To the conscientious practitioner of dentistry it is gratifying to know that, even in this strenuous age, there are many legitimate firms who are earnestly striving to serve the profession in a purely ethical manner. Such firms have no desire to mislead nor to conceal; and while it is true that there are a few preparations, manufactured by some of these concerns, of questionable therapeutic value, such preparations have only been put upon the market because some overenthusiastic dentist has led them to believe that there was a demand for them by the profession. This again is the fault of the profession and not the manufacturers. The profession is purely at fault, too, for the existence of concerns who persist in manu-

facturing "secret formula" preparations; for even these firms manufacture only such articles as they are enabled to sell.

The writer would be happy if in his feeble way he could cause the profession to realize that what we need in dentistry to-day more than the present influx of proprietary remedies is an intimate knowledge of the Pharmacopeia and the pharmaceutical preparations therein recognized, for in the many official waters, liquors, spirits, syrups, elixirs, tinctures, fluid extracts, pills, powders, ointments, etc., or a combination of two or more, can be found the counterpart, or better, of almost every proprietary preparation on the market to-day.

#### CHANGES IN TITLES.

Before leaving the nomenclature of the United States Pharmacopeia, I will call attention to the fact that the titles of a number of official articles have been changed in the Eighth Edition. All Extracta Fluida (fluid extracts) have been changed to Fluidextracta. This should be remembered in prescribing this class of preparations. Instead of writing, for example, Extracti Cannabis Indicae Fluidi, one should now write Fluidextracti Cannabis Indicae. The official 1 per cent solution of nitroglycerin, formerly designated Spiritus Glonoini, has been changed to Spiritus Glycerylis Nitratis. The erroneously-called Acidum Arsenosum has, at last, been changed to its true chemical name—Arseni Trioxidum; and the almost equally erroneous name, Acidum Carbolicum, has been changed to Phenol. It is with much satisfaction that the writer observes the change in the official title of the last two mentioned articles, for he has never been able to understand why an *oxid* and an *alcohol* should have been recognized by our legal authority as an *acid*.

#### CHANGES IN STRENGTH.

The fluid extracts have been prescribed in medicines perhaps more than any other class of pharmaceutical preparations because of their definite strength—one cubic centimeter of the product representing, in solution, the medicinal constituents of one gram of the crude drug. It is gratifying to know that in the last edition of the United States Pharmacopeia there has been an effort made to place the percentage strength of *tinctures*—perhaps a more important class of preparations to us as dentists than the fluid extracts—upon a more uniform basis.

The most important change in the strength of tinctures is that of *Tinctura Aconiti* (tincture of aconite). This preparation in U. S. P. of 1890, was directed to be 35 per cent. In the U. S. P. of 1900, it has been reduced to 10 per cent. It is well to keep this change in mind, for tincture of aconite is an important constituent in liniments used in the local treatment of many diseased dental conditions, especially pericementitis and facial neuralgia.

*Tinctura Belladonnæ Foliorum* (tincture of belladonna leaves) and *Tinctura Cannabis indicæ* (tincture of Indian cannabis) have been reduced from 15 per cent to 10 per cent. Both of these preparations, as is well known, are used in dental practice, respectively, in the local and general treatment of trigeminal neuralgia. *Tinctura Cantharidis* (tincture of cantharides) and *Tinctura Capsici* (tincture of capsicum), both valuable as counter irritants, have been increased from 5 to 10 per cent. The *Tinctura Nucis Vomicæ* (tincture of nux vomica), the *Tinctura Opii* (tincture of opium, laudanum) and the *Tinctura Opii Deodorati* (tincture of deodorized opium), as in the U. S. P. of 1890, are required to be assayed. The former must now contain 0.1 per cent of strychnin, and the two latter 1.2 to 1.25 per cent of crystallized morphin.

There are changes in the strength of many other tinctures; but I believe that I have mentioned those most important from a dental viewpoint.

#### EFFERVESCENT SALTS.

To those earnest and conscientious practitioners who, after years of experience and observation, have ultimately come to the conclusion that certain forms of the disorder commonly called pyorrhea alveolaris can be more successfully treated by the internal administration of certain drugs in conjunction with the local treatment, it will be of interest to know that, among the effervescent salts recognized by the U. S. P., *Potassii Citras Effervescens* (effervescent potassium citrate) has been increased to 20 per cent, and *Lithii Citras Effervescens* (effervescent lithium citrate) to 5 per cent.

#### NEW ARTICLES ADDED.

I desire here to call attention to the fact that many of these newly added articles are products of the synthetic laboratories;

and to recognize many of them by their correct chemical name would be impracticable, owing to the complexity of the molecule. Therefore, as I intimated above, under the heading of "Chemical Nomenclature," the official title is a contraction of the chemical name. For example, Acetphenetidin is the official title for phenacetin, a synthetic product with a chemical formula C<sub>6</sub>H<sub>5</sub>OC<sub>2</sub>H<sub>5</sub>NHC<sub>2</sub>H<sub>5</sub>O, and which is obtained by the action of glacial acetic acid on paraphenetidin (an anilin derivative). In the reaction that takes place an atom of hydrogen in paraphenetidin is replaced by the acetic acid radicle, acetyl. This product may be employed with advantage as an analgesic in the same class of cases as that in which acetanilid has proved to be useful, and can be administered in 5-grain doses in the form of pills, capsules, powders or tablets.

Other articles of importance to dentists follow: Aethylis Chloridum (ethyl chlorid); Antipyrina (antipyrin); Cresol (tri-cresol); Glandulae Suprarenales Siccae (desiccated suprarenal glands; suprarenal extract); Guaiacol (chief constituent of creosote); Hexamethylenamina (urotropin); Liquor Formaldehydi (solution of formaldehyd, 37 per cent); Oleatum Cocainæ (oleate of cocaine, 5 per cent); Elixir Ferri, Quininæ et Strychninæ Phosphatum (elixir of iron, quinin and strychnin phosphate); Sulphonethylmethanum (trional); Sulphonmethanum (sulphonal); Thymolis Iodidum (thymol iodid, aristol).

In order to counteract the miscellaneous prescribing of commercial articles of less definite composition, a number of new preparations have been introduced, two of which are of special value to dentists. Liquor Antisepticus (antiseptic solution or mouth wash), and Pulveris Acetanilidi Compositus (compound acetanilid powder). The ingredients of the former are here given:

Boric acid.....	20.00	Gm.
Benzoic acid.....	1.00	Gm.
Thymol .....	1.00	Gm.
Eucalyptol .....	.25	cc.
Oil of peppermint.....	.50	cc.
Oil of wintergreen.....	.25	cc.
Oil of thyme.....	.10	cc.
Alcohol .....	250.00	cc.
Water to make.....	1000.00	cc.

In prescribing this solution, it is never necessary to write a prescription for these various ingredients as given above. Now that the solution is recognized by the U. S. P., all we have to do in prescribing is to write for the official title, as follows:

**B** Liquoris antiseptici, f. 3xii

Sig.—Use as a mouth wash.

While we do not need to remember the exact formula, it is well to bear in mind that this solution contains 2 per cent of boric acid, 0.1 per cent each of benzoic acid and thymol, 25 per cent of alcohol, and other antiseptics and aromatics added to water as the vehicle.

I will ask my readers to write this prescription and instruct their patients to have it filled by the pharmacist, thereby realizing a satisfaction over the method of simply signing your name, parrot-like, to a printed prescription, so-called, furnished so freely for commercial products.

The formula for the compound acetanilid powder is:

Acetanilid ..... 70 parts

Caffein ..... 10 parts

Sodium bicarbonate ..... 20 parts

In those cases where antipyretic or analgesic drugs are indicated, it is much safer and better practice to prescribe such recognized drugs as phenacetin, antipyrin, or acetanilid, than to miscellaneous prescribe proprietary preparations the constituents of which we do not know without resorting to chemical analysis.

A prescription for the compound acetanilid powder should be written thus:

**B** Pulveris acetanilidi comp., gr. xv

Ft. chartulæ No. 2.

Sig.—Take one powder at once and the other in one hour if needed.

In prescribing any analgesic drug for internal administration, it is best not to write for more than two or three doses. For oftentimes the patient is suffering such pain that they will ignore your instructions, thinking that—"if one dose is good several would be better"—and he will take one dose after another until relief is obtained, and the drug may have accumulated, subsequently producing toxic symptoms. This possibility can be

avoided by prescribing only such an amount as you are reasonably certain will produce the desired effect.

Since this magazine saw fit to copy in its first and second issues an article which I read at the Congress at St. Louis in 1904, and inasmuch as the remedy therein suggested for the rational treatment of putrescent pulps is being used quite extensively by the profession, I will say that it is gratifying to me to know that both tricresol and formalin have since been recognized by the U. S. P., the former as Cresol, the latter, or a solution which amounts to the same thing, as Liquor Formaldehyd.—*Dentist's Magazine.*

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DENTAL LESIONS AMONG THE ANCIENT PERUVIANS, MEXICANS AND MOUND-BUILDERS. By Alton Howard Thompson, D.D.S., Topeka, Kan. Forty or fifty years ago it was quite a fad to blame all the ills that the teeth were heir to upon civilization, with its accompanying vices and luxuries. It was customary to assert in proof of this theory that the ancient, savage and uncivilized races of mankind all had sound and normal dental organs, and that disease and suffering from defective teeth were unknown among them. This assertion was accepted as a fundamental truth by the profession at large and was passed on from author to author without question. From these writers it passed into popular acceptation and even yet occupies a prominent place in newspaper and magazine dentistry. We continually read in these organs of the finding of ancient skulls in which there are no dental diseases, according to the popular writers, and many that "have double teeth all around," and other marvelous things. The savage-perfection theory prevailed in the profession to an extent that was remarkable, considering that it had no foundation in fact and could have easily been disproved by a little investigation. The lines were drawn too closely at the historic civilization of our own times, which had to take all the blame. Ancient civilizations, which were luxurious, and vicious also, were not considered to have the same effect, but were classed with the savages. The theory had great vogue in its day, and has left its impress upon popular dental literature down to our time.

But it finally occurred to some officious investigators to study

the original skulls in the museums in reference to this subject, with the result that the theory was overthrown. Then it was found, for the first time, that the teeth of savage and ancient races were also affected by diseases in greater or less degree. This was a great revelation and brought about a revolution in regard to the savage theory. Further extensive investigations disclosed the fact that there was much dental disease, especially among the ancient semi-civilized races. Among the first of these inquisitive investigators was the late John J. R. Patrick, of revered memory, who made a systematic examination of the skulls of Mound-builders and other ancient races, and many of us can remember with what vehemence he presented the facts he discovered and denounced the savage theory. He threw down the gauntlet to the advocates of the latter with a defiant air, but did not find much opposition. He presented facts that were incontrovertible and demonstrated the presence of dental lesions among ancient races. He was one of the first in the field to attack the hoary old theory, but was soon followed by others, notably by Mr. Mummary, in England, who investigated the skulls of ancient Britons in the crypt of Hyde church, and found much dental disease among them. Magitot, in France, made similar discoveries among the ancient Cymrics. These investigators were followed by others, until the old theory was totally exploded and passed into oblivion.

It is probable that the pendulum has swung too far the other way now, and that we have not of late been making sufficient allowance for the influence of environment. So it is probable that we will again have to remodel our concepts in regard to the effects that civilization, with its environment of vicious living, has upon the teeth. We cannot forget that there is a certain degree of degenerate and diseased oral conditions that is associated with civilized and luxurious living. The association, we cannot but believe, is more than a mere coincidence. There is a basis of truth in the old theory that we must recognize. There is a constant refinement of structure and degeneracy of organization that is the unvarying accompaniment of artificial life, that is very like cause and effect—unfortunately obscure as are the links in the chain. But we must grasp also the fact that dental degeneracy and disease are by no means the product of

modern civilization alone. It accompanied the older civilization also in greater or less degree, which was demonstrated when investigators went direct to the skulls to get the facts. It was then found that the old theory as to all ancient skulls was erroneous. Dental lesions were found to have been very prevalent among the old civilizations also, as with the ancient Egyptians, Peruvians, Mexicans, etc. These civilizations were not equal in luxury, perhaps, to that of modern Europeans, still they were sufficient to induce a degree of enervation and degeneracy that caused considerable dental disease. They were far removed from savagery and lived in a state of comparative comfort and luxury. The refinement of the osseous structures demonstrates this and that they were not subject to the savage struggle for existence. On the contrary, the really savage and primitive skulls were found to be of strong and heavy osseous structure, and dental lesions were found to be more infrequent with them. There was apparent in both these classes, civilized and savage, a difference of structure that could only be due to the differences of environment. In the savage, the fierce struggle for existence maintained a strong osseous system and healthy organization. In the civilized races, the easy life with its comforts and luxuries led to refinement of structure through disuse and the consequent greater tendency to disease. Perhaps natural selection had much to do with this difference also, in that in savage life the unfit soon perished, while in civilized life they are protected and propagate their kind. We know that this obtains to an alarming extent in our modern civilization.

It is probable also that the rapid evolution of civilized man, because of the rapid changes in his environment, has had much to do with his physical degeneracy. It is the consensus of opinion among our leading evolutionists that the human race, especially its higher and more civilized varieties, is in a stage of rapid evolution. This is especially observable in relation to the white races, which are evidently undergoing rapid changes in structure in the strenuous effort of nature to adapt the organism to the rapid changes of environment with which civilized man is surrounding himself. So the modern European races present many varieties, aside from the results of race mixture, which are due to the efforts of nature to meet new conditions con-

tinually being presented. These changes make the descendants of Europeans to-day a very heterogeneous mass. Some of these varieties are self-limiting and will end only in the extinction of the varieties thus evolved, but others will eventuate in the creation of new varieties. Evolutionists say that this chaotic condition of the race, and its great flexibility and susceptibility to the effects of environment in producing variations, is paralleled by the condition of the mammalia in the great Eocene periods when so many forms were evolved, some of which have descended to our own times as distinct species. The rapid changes of structure that the descendants of Europeans are undergoing to-day are reflected in the teeth also, which, as we well know, are varying greatly to adapt them to food habits.

This theory is especially interesting now in the light of some of the new theories of evolution. I refer especially to the law of mutations as proposed by Hugo De Vries. We remember that according to the older theories of the evolutionists, especially as proposed by Darwin in his doctrine of Natural Selection, all changes in structure were due to slow alterations in response to the pressure of environment. The newer doctrine of mutations teaches that changes of structure may be rapid and arise spontaneously, and that such changes of structure may be perpetuated without waiting for the slow processes of natural selection. The old slow law of natural selection was applied to the evolution of man as well, and it was held by Darwin and the older revolutionists that it must have been slow and that consequently untold æons of time must have been necessary to develop the species. The new law of sudden changes or mutations accounts for much that was formerly very obscure and throws a wonderful light upon the evolution of all organic forms. We well know that sudden changes of form or structure are taken advantage of by stockbreeders and gardeners to develop new varieties and that freak forms may start up at any time and be permanent. This has been known for a long time and yet it is only now that we come to recognize it as a law. Slow, progressive changes have been operative, of course, but they are not the only ones that have had effect upon the evolution of organic forms. The law of mutations must also be considered, and it is in its workings quite as beautiful and wonderful as the law of natural

selection. It is a most fruitful discovery, and the wonder is that it has not been brought out before. With this principle in mind it is easy to account for many of the changes that have apparently taken place, especially in the evolution of the dental mechanism in man, and for its many imperfections and degeneracy under the influence of environment. The law applies most beautifully and accounts most accurately for much that heretofore has been obscure. We can now understand, with this light, how the great ancient civilizations, which rose, flourished and died within a few thousand years, could have effected such radical changes in the physical structure of man. This is abundantly illustrated in modern civilizations also. It was formerly held, and seemed true, that these changes must require more time than the history of the ancient civilizations, or of the European civilizations with their few brief centuries could allow. But with the law of mutations and the sudden appearance of alterations the whole subject becomes more clear. The effect of rapid changes of environment becomes more appreciable and the rapid changes of structure that ensue are now to be accounted for according to the beautiful new law of mutations.

With these considerations in view, it is with especial interest that we approach the study of the diseased and degenerate conditions found in the ancient semi-civilized races of Peruvians, Mexicans and Mound-builders. In my ethnographic studies of these peoples I made some memoranda, with a view to a compilation, such as this. According to the old theorists these races all had good teeth, and even yet such assertions may be found in the newspapers and magazines, coming from the observations of inexpert observers and authors. Indeed, it is not long since a writer in a dental journal asserted that the ancient skulls in the National Museum of Mexico showed no evidence of dental diseases, a statement which my own observations in the museum disprove. The assertion was made without sufficient care in making observations, very evidently. In all three groups that I have made extensive ethnographic studies of—*i. e.*, the Peruvians, Mexicans and Mound-builders—dental lesions of greater or less extent and variety were found to be present and coincidentally all three had more or less civilization of a kind, with varying degrees of luxurious living. They were far from being savages, very

far. They could not properly be classed with the strictly savage races, such as the Australians, Negritos and African negroes of to-day, nor with the more remote savages of earlier geological periods, who all possess distinct anthropoid features. A sharp distinction must be made between ancient or modern civilized and semi-civilized races, and pure savages, who have well-marked anthropoidic characters. In the first class are to be found refined osseous structure and dental diseases; in the other, a coarse and simian structure and a less amount of dental disease. This distinction must not be forgotten.

The Peruvian group was the first in which I made extensive studies, taking notes on about 500 skulls. I regret that I cannot give exact statistics, as it was not possible to enumerate all of the teeth and to differentiate them as to normal and abnormal conditions. My especial studies were not in this line, and the pathological observations were merely incidental to the other work. The Peruvians were, as is well known, living in an advanced stage of civilization for their times, at the date of the conquest, and they probably had quite as much of the comforts and luxuries of life as the average European of the same date. Their remains show that their manufactures were as good as those of the Europeans of the same time, and their moral attainments were vastly in advance of the cruel and bloody conquerors who overthrew their civilization. The luxuries and vices that prevailed served for the evolution of a refined osseous organization and of dental lesions of the common varieties. Having an advanced civilization we find corresponding defects of structure due to such environment, as might be expected. Observations made on the skulls show that their civilization and luxurious surroundings, such as they were, had affected the jaws and teeth, resulting in deformities, irregularities, diseases, etc., that were quite common. There was considerable abrasion of the occlusal surfaces, as might be expected with their usual diet of maize, with its hard silicious covering and the grit that entered into it when ground in the stone mills, and other forms of coarse food. There was much evidence of alveolar abscess from this abrading and exposure of the pulp. Great cysts in the jaws told stories of suffering that were only too plain. No adult skulls were observed in which there was not considerable abrasion, and in the

older ones it was very destructive. Only in the young skulls could the pattern of the occlusal surfaces be made out minutely. This wear of the teeth was probably often caused, as in the modern Peruvians, by chewing the cocoa leaf with its own silica mixed with a gritty substance called lute, made of wild potatoes, calcined shells and ashes of cacti or other plants rich in alkali. There was the frequent occurrence of teeth that were stained dark green or blue by coca chewing. This habit was, and is to-day, a most remarkable one. The leaves of the plant, *Erythroxylon coca*, were considered sacred and the chewing of the leaves was accompanied with considerable ceremony. It was placed in the mouths of mummies and about them, and entered into the life of the people to a great extent, both in utility and ceremony. The plant has always been extensively cultivated in Peru and its use is of great antiquity. It is both stimulant and narcotic, and the habitual user requires very little food. It does not seem to be injurious to health when not used immoderately among the Peruvians of to-day. Laborers demand it in order to sustain prolonged exertions and the amount of fatigue that it will enable an Indian to endure is something marvelous. It also assists respiration at high altitudes and materially aids in making life pleasant there, the abode of so many Peruvians. It was a great gift to the world at large, as was also the alkaloid cocaine, obtained from it, which has been of such inestimable service in the alleviation of human suffering. Tschudi, in his "Travels in Peru," says: "All who masticate coca have pale lips and gums and greenish teeth." As the leaves are mixed with unslackened lime in chewing, this probably aids in making the stain thorough and permanent. Salivary calculus is often found stained green also.

Some calculus was found on the teeth, but not on many was it present in very great quantity. It was often associated with teeth that were extensively carious, and disuse of the affected side had allowed it to collect there, but it was not often present on the lower incisors in quantity.

Some caries of the teeth was found, but not a great amount, comparatively. It was usually small, but in some cases was very destructive with abscesses and cysts. Very rarely carious roots alone remained. It occurred in all the usual positions, but

was more frequent on the posterior than on the anterior teeth. The amount was probably one-half what it would be in an equal number of European skulls. In my notes the mesial and distal cavities seem to be more frequent than any other position. Altogether caries was not of very frequent occurrence, which indicated a healthy use of the teeth as well as resistance to deleterious influences.

A most interesting study among the ancient Peruvians was that of dental malposition, of which there was a considerable amount. As you know, there was a great amount of artificial deformation of the skull. One type was that of elongation of the cranium backward by bandaging, and another was the fronto-occipital flattening by the candle-board pressure, as was common among the North American Indians, both ancient and modern. It was of great interest in my studies to try to ascertain if there was really any connection between this artificial deformation of the cranium and malformations of the dental arch, but I failed to find any connection. Skulls that were excessively deformed by artificial pressure would have perfectly normal arches, and whatever of irregularity of the teeth and distortion of the arches that occurred was evidently due to congenital causes. This was very evident after careful observation and comparison. It was rather startling to find that there was much deformity of the arch and malposition of the teeth. Compression at the bicuspid teeth was not infrequent, even to the extreme form called the "saddle arch," and V-shaped arches were not uncommon. These malformed arches were not associated especially with artificially deformed skulls, but were found with normal skulls as well. There was no apparent connection with artificial deformation. It is true that there is a skull of an Inca in the Field Museum which is greatly elongated and has a compressed arch and very irregular teeth. Another Inca has a V-shaped arch, flattened from the central to the first molar on the right side. Of course these deformed arches were not common, for, as a rule, they were round and full and of fine shape. As to malposition of the teeth, an irregularity of the upper centrals that occurred with surprising frequency was the rotating inwards of the mesial borders. It was a surprise how often this was observed, in greater or less degree. This usually resulted in the destructive wear of the

mesial borders, of course. A common form of malposition of the upper laterals was lingual maloclusion by closing within the lower incisors, with the usual overlapping of the centrals and cuspids, and consequent contraction of the arch. The lower incisors were frequently out of alignment, standing within or without the arch. Lingual eversion of the mesial borders of the centrals was not uncommon. The upper cuspids were quite frequently rotated outwards at the distal borders. In some cases they were erupted within the arch, but this was not common. The lower cuspids often stood without the line of the arch, which was their usual deformity. The upper bicuspids exhibited a most unusual amount of malposition. Being rather small in size and defective in contour, as compared with those of Europeans, they were prone to displacement, as if they were weak and did not have the same eruptive force as the competing stronger cuspids and molars. They very frequently stood within or without the line to the extent of one-half or the whole of the width of the crowns. Bicuspids erupting entirely within the arch were not uncommon, the arch being completely closed up and contracted at that point. Some were found impacted in the alveolus, apparently not being able to force their way into the arch. The crown was frequently rotated also, sometimes to the extent of one-fourth or one-half of the circle, the buccal and lingual faces changing sides. This unusual type was far from uncommon. The lower bicuspids were subject to the same disturbances and frequently stood outside the line of the arch. The crowns were rotated also, but not so frequently. The upper molars were sometimes out of line, especially in the contracted arches, but there was no excessive disturbance. The third molars, however, presented all the usual types of disturbance, with surprising frequency. There was a remarkable amount of impaction of the lower third molars by tipping against the second molars, and some turning outward. There was a noticeable percentage of total absence of these teeth also. There was frequently defective form and deficiency of crown, even to the peg shape. Indeed, the erratic forms and malpositions of these teeth were quite as frequent as with Europeans, which we are prone to believe is due, through evolution, to the suppressive effects of disuse on the jaws.

Taken altogether, the dental lesions of the Peruvians were, I believe, due to the swift changes produced by the rapid acquirement of a higher culture and luxurious living, as compared with the true savages.

The heterogeneous tribes of Mexico were and still remain of mixed ethnological character, although they may be generally classed in two main families, the *Mayas* and the *Nahuas*, the former the more ancient and the latter the more recent and widespread, according to Bancroft. These tribes, both formerly and latterly, were very heterogeneous and various as to types and culture. Some of them, as the Zapotecs, are fine physically, and others are coarse and uncouth, but they have kept distinct for centuries. My studies of their skulls were of a limited number of tribes, but my observations are fairly representative as far as they go. These were mainly of the Aztecs and the Tlatelolcos of the valley of Mexico and the Tarascans of Michiocan and others of Nahua stock. My material was found chiefly in the American Museum of New York and the National Museum of Mexico. These Nahua tribes represented a civilization that had arisen very rapidly after the conquest by the fierce Aztecs, in the city and on the plateau of Mexico, and the process of the forcible fusion of conquered tribes was not yet complete when the Spaniards appeared. The government of the Aztecs was in the process of evolution and was dominated by a tyrannical sacerdotalism that found its cruel vent in the bloody sacrifices of human victims to their insatiable and bloodthirsty gods. Their culture was far below that of the mild Peruvians, for their ethical standards were brutal and inhuman. They had not attained anything like the refined culture of the Peruvians and their social and governmental evolution was far below, and was crude and despotic. The Aztecs were savage in instinct and although a certain amount of comfort was attained by the ruling classes, the masses of the people were living in unmitigated savagery, dominated by a heartless hierarchy that ruled them with a rod of iron and reared them on the unspeakable spectacle of bloody sacrifices of human victims to their fearful gods, so we must conclude that they did not have the high civilization of the Peruvians nor the same elements of culture and luxury, and this in the face of the fact that they had an elaborate system of ritualism and were very artistic in their style. In conse-

quence we find that there was not the same refinement of osseous structure nor the amount of dental disease that was found among the Peruvians. The skull was much more coarse, although generally orthognathous like the Peruvians. The Tlatelolcos of Mexico City were much more delicately formed, being apparently considerably enervated. They were the most refined of the group. The dental arches were generally round, but many were V-shape or round-V, which seemed to be the most usual. A few large square arches were found among the skulls from the outside districts, where the stage of culture was distinctly low and more savage. A few jaws were much contracted and a very few were saddle-shaped, and some V-shaped from crowding of the teeth. There was marked malposition of the teeth in a proportion that caused much surprise, which showed all too plainly that the civilization of the Mexicans, such as it was, induced some kind of rapid evolution that produced degeneracy. They were evidently at a period of rapid evolution and were overtaken by the Spaniards before attaining a stage of permanency. They were caught in the act, so to speak, and their indigenous culture was swept away. As to the malpositions of the different teeth, the upper centrals exhibited much disturbance, usually consisting of rotation and the lapping of the sides of the crowns. There was some mesial inversion like the Peruvians presented, but not quite so much. The centrals stood back of the line and occluded lingually of the lower incisors in several cases, almost as much as the laterals. The latter were much disturbed as to line position and rotation. The lower incisors were very irregular, and one-half rotation was not uncommon, presenting all the disagreeable conditions of crowding of these teeth that we are familiar with in Europeans. The upper cuspids stood out one-half to full width in many cases and were often everted outward at the distal borders. There was also suppression of these teeth, the tooth being retained in the bone. The lower cuspids were also irregular, standing out of line and everted at the distal border. The bicuspids, being so small and defective in the Mexicans, are the subject of much disturbance, frequently standing within or without the line of the arch, their weakness apparently preventing them from holding their own in the struggle for position. The molars were not much displaced, slight deflection or rotation being the only irregularity. The third molars,

however, were very erratic, not quite so much so as the Peruvians, but malpositions and impactions were not uncommon, usually being tipped or impacted against the second molars or turned toward the cheek. Imperfection of form of the uppers was observed and total suppression was frequent. Their irregularity of form, presence or position varied, of course, with the refined or coarse structure of the skull and the presence of anthropoid features.

There was not so much destructive abrasion of the teeth as with the Peruvians, so that the general effects of wear were not so marked. Indeed, many adult skulls were observed in which the occlusal features and the anatomical elements of the crowns could be distinctly made out, which assisted materially in my ethnographic studies. As the food of the people must have been coarse, this absence of abrasive wear is rather surprising. We know that the people of Mexico live largely on maize ground in stone mills, and it must have been the same with the ancient races, or perhaps they lived more largely on fruits. But be that as it may, there was a notable absence of wear and of consequent abscesses and cysts as well. Of calculus there was a greater amount than with the Peruvians, and in some skulls an excessive amount on the lower incisors, so that there was this marked difference. Caries was found in a less degree than with the Peruvians, but was present in a number of skulls. The positions were mainly the mesial and distal surfaces of the molars and bicuspids. The latter were especially prone to it owing to their excessive smallness and weakness. Anterior caries also occurred, but not so much. Destructive abscesses were not frequent from extensive caries. A conspicuous pathological condition of the Mexicans of that day, as of this, was the prevalence of syphilis. Many of the skulls were dreadfully affected, but I failed to find any notched teeth, which is rather surprising, considering the extent of the taint. The absence of one of the upper centrals in many of the skulls was a curious feature, and it is remarkable that its absence is observed also in the living Mexicans of to-day. A practitioner assured me that this was probably due to specific taint also. It was a curious coincidence.

An interesting archeological feature observed in some Mexican skulls was the artificially notched anterior teeth, the edges being cut into steps. This probably has a religious significance, as the teeth

of some statues of the gods also have the same markings. Such skulls might have been those of the priest of the gods, the notches having a sacerdotal meaning. It is well known that such step-like forms in the mythology of the Pueblos mean clouds and are a rain prayer. Dr. Rojo presented at the International meeting, 1904, some very interesting prehistoric teeth from Mexico, with ground inlays on the labial surfaces. They were probably for ornamentation, as they were found only on the labial surfaces of the anterior teeth.

I regret that my data and observations on the ancient Mexicans are not more full, but opportunity is limited, as the skulls of the aborigines are really very scarce in the museums. Such observations as I was enabled to make, however, seem to indicate that the tribes studied were not as far advanced in the elements of civilization as the Peruvians, and had a less luxurious and enervating life. They were evidently in a transition period, but with their frightful and cruel customs it is doubtful if they would have attained the civilization of the Peruvians. At any rate, their physical organization had begun to change, though it had not progressed very far on the road of degenerative evolution.

The Mound-builders of the Mississippi valley are a most fascinating study, and what little we know of their culture and civilization from their meager remains, only whets the desire to know more of them. That they were the ancestors of the historic Indians, as is held by some high in authority, is highly improbable, although some of the historic tribes did build mounds. The writer is of opinion that they were emigrants from Mexico, by way of the gulf and the Mississippi valley, and that they gradually scattered and formed separate groups which remained so long isolated that they developed different kinds of culture that varied greatly. But the basis of all their culture was the same, and the inspiring influences were brought with them from Mexico. This is demonstrated by the mounds, which resemble the teocallis and the temple mounds of Mexico; their art as shown in pottery and shell ornaments, the physical resemblances, and especially as expressed in the dental somatology, etc. The writer feels warranted in making comparisons with the Mexican Indians on account of this relationship. The Mound-builders were a mild people and were therein different from the fierce conquerors of the Mexican plateau.

They were more like the peaceful Toltecs who occupied the valley of Mexico before the conquest. It is, indeed, more than probable that they were descended from them. The Toltec civilization was totally extinguished by the Aztec power, so that little of it remains to-day—so little, that some writers consider the Toltecs a myth. But the writer is inclined to the opinion that the Mound-builders were descended from such a wild people in Mexico, for they were unwarlike and soon melted away before the warlike Algonquins and Shawnees who descended upon them from the north and probably extinguished the last of the Mound-builders. Their remains show that they were a sedentary and agricultural people, given to peaceful pursuits, in many ways like the Pueblos of the Southwest of to-day. They had high architectural abilities, as is evidenced by their extensive and elaborate earthworks. Their art, what remains of it, shows a high artistic instinct, so we must attribute to them a culture that was far removed from savagery. That their life was quiet and enervating to a degree is shown by some degenerate features, although these are very erratic and irregular. Indeed, the whole story of their life and environment is very difficult to read.

There is a mixture of savage and refined features in their osseous and dental structure that is very bewildering. For instance, there is a remarkable prevalence of prognathism. Very few of the skulls observed were orthognathous. This simian feature taken in conjunction with the degenerate dental characters is quite puzzling. It would seem that the evolution of their cultural attainments must have been rapid, and that there had not been time for the corresponding alterations and refinement of structure consequent upon more civilized environment. So we find the savage and refined features greatly mixed in the Mound-builders and it is all very confusing.

Malposition of the teeth was very interesting on account of its frequency among these people. The deformities due to this lesion were not extreme or complicated, yet there was a considerable percentage of evasions, rotations, slight divergence from the line of the arch, or complete misplacement as regards alignment and occlusion. The most common forms were eversion of the upper centrals at the mesial borders; rotation of the laterals and overlapping; the lower incisors rotated and standing within or without

the arch; the cuspids standing out of line partly or full width of the crown; the bicuspids crowded in or out of the arch; and there was considerable deformation and displacement of the third molars. The latter were often tipped and impacted against the second molars. There were not as many reductions in size or suppressions of these teeth as with the other groups that we have been studying, and there was a larger proportion of the complete forms. Of slight malpositions of the teeth there was a surprising amount, considering the prognathism and the large size of the jaws and the apparent abundance of room in the arch. There were rarely any contracted arches and no saddle-shaped ones.

There was a very unequal amount of mechanical abrasion, being extreme in some groups and less so in others, but altogether the wear of mastication was light for so primitive a people and whose food was probably largely maize. Very little salivary calculus was observed and no large deposits. An occasional case of transverse grooving was observed in all of the groups, but pitting or other marks of congenital disease were notably absent.

Caries was present in all of the groups of the Mound-builders examined, but in a less degree than in the Peruvians and Mexicans. It was much less in the Saginaw mounds, the Tennessee stone graves and the Arkansas groups. In position the cavities were mostly on the distal and mesial faces of the bicuspids and molars, with occlusal next in frequency. In very few it was extensive, exposing the pulp and leading to abscess. So many of the phenomena of dental disease were presented by this ancient people, showing a degeneracy that was produced in some way by their environment.

There is not much to sum up in the way of conclusions. The evidence I gathered shows that there was a large proportion of dental disease among these people and that it bore a relation to the degeneracy induced by environment through rapid evolution. In opposition to the old writers we observe, even from the limited observations that I made, that these ancient semi-civilized people were affected by dental lesions and that they had the same results as the later civilized races. I regret that my observations were not more elaborate, but I hope that this contribution will not be altogether unprofitable.—*Dental Brief*.

THE CONSTITUTIONAL FACTOR IN DEGENERATION OF THE TEETH. By Herbert Steynor, L.D.S.Eng, Great Malvern, England. The system of party politics is the natural outcome of a tendency inherent in many people to exaggerate their pet ideas. No method is more profitable to the community, or more seductive to the individual. We must take sides.

On the subject of degeneration of the teeth various writers have selected what seemed to them *the* important cause, and unconsciously (or otherwise) ignoring other contributory causes, have made that their obsession. On no other hypothesis can I explain to myself the confident assertions that have, from time to time, been made on this matter.

Some years ago (1894) there appeared in the paper *Nature* a correspondence on the cause of degeneration of the teeth in civilization. "The insufficient use of teeth," "the over-use of eyes," "improper food," "hot drinks," etc., were some of the reasons assigned; each writer had settled upon his important cause, and, in some cases, disregarded all the rest. Many submitted papers were, doubtless, rejected, for strange are the ways of editors. Among these was one written by Dr. Allen, late Professor of Physiology in Mason University College. His thesis was that the degeneration of the teeth was due to "the opposition of the medical art to natural selection." With true philosophic insight he went to the root of the whole matter by regarding dental caries as a constitutional disease. As the survival of the fittest is Nature's way of securing physical health, interference with that law must inevitably lead to physical disease. The improvement in obstetric art, and the skill of physicians in treating disease in children, enabled many to reach the marriage age who would otherwise have perished in the struggle for existence. One of the more obvious results of these weak constitutions was a defective dentition. As sexual selection still survived in our marriage arrangements, dental art undertook the office of making presentable those whom Nature, unaided, would have left on the shelf. Heredity preserved these unfavorable variations in the succeeding generations, and so, theoretically, things went—as we know to our sorrow they do go—from bad to worse.

When a student I wrote in an essay entitled "The Oral Secretions in Health and Disease," the words: "It is in the secretions

of the mouth that the origin of the dental caries must be sought." The labors of Miller, with their negative results, as far as etiology is concerned, are fresh in the memory. The secretions have been asked the riddle, but they have not yet given the answer.

There are certain conditions necessary to caries, such as the retention of food particles, adherent epithelial cells, etc. But they are only conditions—not causes. Those kinds of food which cling about the teeth, and thus aid the formation of the right conditions for decay, *e. g.*, carbohydrates, are to be regarded in this light also. The acid results of bacterial action are the immediate local cause of caries, but the constitutional resistance must be weakened before such a cause can act. It is, I believe, the resistance which has been lowered, rather than any great change of food, which has enabled this disease to become so prevalent. With strong resistance any kind of food can be taken with impunity. Improve the kinds of food—in a dental sense—but without a change in the constitution caries will continue.

One of the frequent causes of arrested decay is a sea-voyage. What little alteration there may be in the food supply—generally a substitution of biscuits for bread—should have the contrary effect; for perhaps no article of diet has been so justly condemned on account of its property of forming plaques on the teeth, and thus feeding and retaining bacteria *in situ*. The improved constitutional health is, in this case, the obvious cause of the arrest. If present-day feeding were the real cause of dental caries it would be impossible for anyone to escape. Provided there is sufficient constitutional resistance local influences are powerless to harm.

The period of comparative immunity between the ages of, say, 23 and 43, is not due to change of food, but corresponds to the age of greatest constitutional vigor. It has been frequently noted that this period of immunity is only attained when all cavities in the teeth have been filled. In other words, the constitutional weakness resulting from an improperly kept mouth prevents the favorable balance of resistance being reached. It is further a matter of common observation that the stronger, constitutionally, a person is, the stronger and freer from defects the teeth are. Great physical strength may co-exist with a weak constitution, and so mask the apparent truth of this.

In the complex relations of biological science nothing is so easy

as the changing of the terms, cause and effect. So much stress has been put on the dietetic factor by a recent writer that many have come to regard the cleansing action of fibrous foods as in itself the cause of immunity from caries in people who subsist on such a diet. What I would urge in opposition to this conclusion is, that valuable as may be the elimination of the right conditions for caries, it is the physiological stimulation of tooth metabolism, rather than mechanical cleansing, that determines the susceptibility to decay. It may be necessary to change the nature of our dietary in order to get this stimulation, but the important result of the stimulation is physiological, not mechanical.

It is impossible to do justice to a writer in a sentence; and anyone who has read the valuable works of Dr. Sim Wallace will recognize the incompleteness of the above statement. He appreciates, of course, the physiological stimulation of salivary and mucous glands, etc.; and no such bald expression as "mechanical cleansing" can pretend to cover the multitude of correlated results that he expects would follow a more rational use of foodstuffs. The question is—what controls the susceptibility to caries—the presence or absence of suitable conditions, or the relative strength or weakness of the vital resistance, as expressed in tooth metabolism? The nature of this tooth metabolism will be mentioned later.

To say that the teeth of a child whose parents are edentulous through caries are as good as those of a child whose parents' teeth are sound, is to say that a good constitution is of no avail against dental disease. This is almost daily contradicted in my own experience. Caries may supervene after a period of immunity. Are we to suppose in such a case that a change of diet is alone responsible for the onset of the disease?

Dr. Wallace says that caries is of the nature of a mutilation and cannot therefore be inherited. Granted. One cannot inherit caries in the sense that trouble in a lower molar in the parent will be followed by trouble in the corresponding tooth in the child. But it is surely possible to inherit a weak constitution—weak, that is, against particular invading agents. The tuberculous parent may pass on a strumous diathesis to the child, and the child be thus rendered particularly weak, constitutionally, against tubercle. It is not tuberculosis that is inherited, but the particular constitution most favorable to it.

It seems necessary to add a word in defense of the term degeneracy, as applied to the teeth. When it is said that "the teeth of the present day are as perfectly formed from a microscopical and chemical point of view as are the teeth of those races which are practically free from caries," and that therefore they are not degenerate, one should remember that the chemical analysis of a tooth applies only to its inorganic, and probably least important, part; and that microscopical examination of living protoplasm from a tooth is unobtainable. That a tooth the metabolism of whose organic parts is defective—due to a weakened constitution—may with propriety be termed degenerate, I shall endeavor to maintain; nor would apparent macroscopical identity of teeth in the mouths of susceptible and non-susceptible persons convince me that they were inherently similar.

Enough has, perhaps, been said in preparation for the following generalization: *The cause of dental caries is to be found in the impairment of the vital resistance of the individual.*

Perhaps the nearest approach we can, as yet, make to the nature of this vital resistance, is by analogy. We are all exposed daily to various disease bacteria, but provided we are in good health we take no harm. Any condition that lowers the constitution makes us vulnerable. *The normal vital resistance is sufficient to secure immunity.*

The difficulty of logically connecting dental degeneracy with any definite cause of constitutional weakness is increased by the fact that caries is not a modern disease. We have no very definite information when it took on its present characteristics. There are old men living to-day who recall their dental troubles as having commenced in their earliest years. But there is a general consensus of experience among dentists that their older patients have teeth stronger and freer from defect than can possibly be expected for the younger members of their *clientèle* when they arrive at a like age. We may take it as a general truth that the last hundred years have seen the progressive dental degeneration that we all deplore. It is more certain that the last fifty or sixty years have presented the spectacle of a marked increase in prevalence of caries in its successive generations. It is hardly necessary to point out that an enormous number of generations are comprised in sixty years, according to the date of commencement of each series.

In spite of the difficulty above mentioned, there is one cause of constitutional weakness which I would urge in explanation of the increasing defective condition of the teeth. It is *vaccination*.

It will be remembered that Jenner commenced his experiments on human beings in the years 1796 to 1798. Although vaccination was performed on a considerable portion of the community during the succeeding half century, it was not until 1851 that the treatment became nominally compulsory. The subsequent Acts of 1867, 1871 and 1874 made compulsory vaccination effective in England. It was estimated in 1897 that 95 per cent were vaccinated in this country.

We see from these dates that vaccination has been synchronous with the deterioration of the teeth—the half century that compulsory vaccination has been in force roughly corresponds to the time in which our knowledge of progressive dental degeneracy lies.

The late Herbert Spencer, writing on the subject of vaccination in 1902, said: "It is held that the immunity produced by vaccination implies some change in the components of the body; a necessary assumption. But now, if the substances composing the body . . . . have been so modified as to leave them no longer liable to small-pox, is the modification otherwise inoperative? Will anyone dare to say that it produces no further effect than that of shielding the patient from a particular disease? You cannot change the constitution in relation to one invading agent and leave it unchanged in regard to all other invading agents. What must the change be? There are cases of unhealthy persons in whom a serious disease, as typhoid fever, is followed by improved health. But these are not normal cases; if they were, a healthy person would become more healthy by having a succession of diseases. Hence, as a constitution modified by vaccination is not made more able to resist perturbing influences in general, it must be made less able. . . . We have no means of measuring alterations in resisting power, and hence they commonly pass unremarked. There are, however, evidences of a general relative debility. Measles is a severer disease than it used to be, and deaths from it are very numerous. Influenza yields proof. Sixty years ago, when at long intervals an epidemic occurred, it seized but few, was not severe, and left no serious sequelæ; now it is permanently established, affects multitudes in extreme forms, and often

leaves damaged constitutions. The disease is the same, but there is less ability to withstand it.

"A high authority, Sir James Paget, says: 'After the vaccine and other infectious or inoculable diseases, it is, most probably, not the tissues alone, but the blood as much or more than they, in which the altered state is maintained; and in many cases it would seem that, whatever materials are added to the blood, the stamp once impressed by one of these specific diseases is retained.' Here is a distinct admission, or rather assertion, that the constitution is changed. Is it changed for the better? If not, it must be changed for the worse.

"It is a familiar biological truth that the organs of sense and the teeth arise out of the dermal layer of the embryo. Hence abnormalities affect all of them; blue-eyed cats are deaf, and hairless dogs have imperfect teeth. The like holds of constitutional abnormalities caused by disease. Syphilis in its earlier stages is a skin disease. When it is inherited the effects are malformation of teeth, and in later years iritis. Kindred relations hold with other skin diseases; instance the fact that scarlet fever is often accompanied by loosening of the teeth and the fact that with measles often go disorders, sometimes temporary, sometimes permanent, of both eyes and ears. May it not be thus with another skin disease—that which vaccination gives?"

Vaccination, like the other eruptive fevers, expends its force on the superficial tissues. It is a common observation among dentists that the arrest of development of the teeth, shown by their defective structure, corresponds with some derangement of health in early life. This is particularly true with regard to the skin diseases. From a knowledge of the dates of development of the teeth it is easy to determine the approximate date when a child had an illness.

The four first permanent molars, which erupt at the age of six years, have for the ensuing six years of the child's life to perform the most important double function of mastication and of maintaining the relations of the two jaws during the changing of the deciduous teeth. The failure of these teeth to do this affects disastrously the subsequent dental development. The calcification of the crowns of these teeth takes place at the age vaccination is usually performed—within the first six months of life. These

same teeth are considerably more prone to decay than any others of the series. Although their position and date of eruption are such as to make them the most important of the whole set, they rarely survive, without a lot of dental attention, to perform this double function. From this cause arise many of the irregularities, of the teeth, which further leads to disease and their early loss.

This suggestion of vaccination affecting the first permanent molars particularly, by interfering with their calcification, is, of course, only one very limited aspect of the subject. It does not prejudice the main contention that vaccination lowers the vital resistance, and so enables local forces to act on the teeth. The latter seeks to explain susceptibility of both temporary and permanent teeth, and not merely those arrests of development which vaccination may cause in common with the other eruptive fevers.

Whether or no we believe in the inheritance of acquired characters, we may at least hold that a weakened constitution must have a deleterious effect on the germ cells. And it is to this hereditary transmission of a weakened constitution that we must ascribe the progressive deterioration of the teeth in successive generations.

That vaccination is one of those "oppositions of the medical art to natural selection" only tends to show how fundamental was the thesis put forward by Professor Allen. The contention against vaccination is but a specialized application of the larger truth.

I am now about to enter upon delicate ground, and indulge in some purely philosophical speculations as to the *modus operandi* of vital resistance in the teeth.

It not infrequently happens that after starting the preparation of a cavity for a new patient, I ask, "Who recommended you to use camphorated chalk as a dentifrice?" When the diagnosis has been correct the patient is usually not a little surprised that I should know. The camphor has permeated the whole tooth, and, perhaps, partially destroyed the organic matrix, thus leaving the inorganic salts without their usual support, a brittle tooth being the result.

In addition to recalling this well-known fact, I must premise that a dentinal fibril is nothing more than the continuation of an odontoblast cell. Morphologically, a Tomes' fibril is like a long

cilium, and is, I take it, composed of cytoplasm continuous with that of the parent odontoblast cell.

I would suggest that acids and alkalies can pass through the enamel and dentin of a tooth. The passage of acid through a tooth—so long as it does not accumulate in the cytoplasm of the cell composing the protoplasmic filament—does not do any harm; is, in fact, a normal process. The transference is effected by the cytoplasm of the cell, which passes on its acid excreta to the blood plasma in the pulp, and so on into the general circulation. The failure of the cells to react normally leads to the intensification of the acid at the periphery of the enamel, which eventually causes a weakening of that tissue, followed by bacterial invasion. A lowered constitution causes an inefficient metabolism of the cells. Theoretically, this dispersal of acids as quickly as they are formed would account for the immunity enjoyed by some people even in the presence of all the local conditions of caries. The recent tracing of organic filaments into the substance of the enamel serves to explain the possible channels of transference through that tissue.

An obvious difficulty is the behavior of pulpless teeth. But enamel and dentin are still nourished by means of the periodontal membrane, so that the accumulating acidity might be carried off by that tissue.

There is, as yet, no theory by which immunity or susceptibility to caries can be explained. What I here offer, though shadowy in the extreme, is at least a hypothesis. Its congruence with clinical and chemical facts awaits future research.—*British Dental Journal*.

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THE DENTAL SOCIETY: ITS OBJECTS, ADVANTAGES AND ORGANIZATION. By Dr. T. E. Weeks, Minneapolis, Minn. The old idea of secrecy and seclusion finds no place in the minds of the dental profession of to-day; it is generally conceded that contact with others, resulting in an interchange of ideas and methods, is a great stimulus to individual growth. Upon entering a restaurant in any of the larger cities at the lunch hour it is not uncommon to see several dentists seated together. If invited to join the group, you will find that the conversation, while not dominated by shop talk, is generously interspersed with incidents

of practice and new ideas gained from reading or from conversation.

Who of you that have been privileged to join some of these jolly groups during visits to Chicago or the Twin Cities did not return home with new ideas and renewed vigor for your daily tasks? This is association. The society aims to provide opportunity for such mingling together at a stated time and place, frequently for several days together, in order that the commingling may be general; object, general improvement. This great primary object does not recognize any political factors, and none should be permitted to creep in. The advantages of such association are its natural children—they cannot help being born, and their surname is "individual growth." In the prospectuses these advantages are called "mutual improvement."

In all organized societies it seems necessary to observe certain formalities, for without some rules of order and a governing head time is wasted and little of lasting benefit accomplished. Everyone who has occupied the chair knows how difficult it is at times to keep the discussion within the lines of the subject in hand even when supported by definite rules; so we have a constitution and by-laws by which the society is governed. These name the officers and define their duties, set forth the objects of the association, define the duties of members and furnish such laws as seem necessary and wise for the government of the body.

Given a desire on the part of a number of dentists to associate themselves in an organized society, nothing is of so much importance for the future welfare of the society as a wise constitution. Believing this, the bulk of this paper will be devoted to suggestions based upon experience and observation. First, the constitution should be free from high-sounding phrases and useless verbiage—concise, brief and to the point. As an illustration I will cite the constitution of the National Institute of Dental Pedagogics, which is but little longer than the name of the society; but under it you have seen the society grow from its original form as the National School of Dental Technics, until now it embraces all that pertains to dental pedagogy, counting among its members the majority of the dental colleges of America and standing in importance and usefulness second to no other organized dental body in this country. The problems confronting that body

are no different from those which will present themselves to you as a state organization. Being familiar with this document from assisting in its framing and working under it for a number of years, these suggestions will naturally be in harmony with it, although differing in some points. The object may be briefly stated as mutual improvement and the advancement of the profession in the state.

The membership in a state society should, in my opinion, embrace all reputable dentists in the state who will subscribe to the constitution and code of ethics. This code must be the one prescribed by the National Dental Association, if you desire representation in that body.

It has been urged by some that membership in dental societies should be restricted to those who will agree to contribute something—a paper, clinic or discussion, at stated intervals. This is wise for a local or district society; these *should be* training schools for the state body. If conducted on this plan, a rule limiting membership to those willing to work would accomplish better results than if the drones were admitted; drones are of little use, and where all the members of a body work there is apt to be less politics.

The opponents of such a rule argue that societies are organized to educate; hence all should be admitted. My observation is that you cannot educate a man who does not desire education. If he does desire it, he will seek the means; furthermore, no one ever criticized or turned his back on a society which fulfilled the objects for which it was organized, but only when it degenerated into a ward caucus.

Another observation: If every man goes to the meeting with something, be it ever so small, there will be so much doing that the long-winded fellows with axes to grind will never get near the grindstone.

Gentlemen, it rests with you individually what the future will be. If each of you will spend the time usually consumed in hunting up something to criticise, in searching for something from your store of experience, furbishing it up and getting it ready for presentation at the next meeting, there will be nothing to criticise. I hear someone say, "I can't write a paper," or "I can't clinic," but who among you would be willing to acknowledge that

he had not some idea that might be told in a line or two, or some little part of an operation which he believes would improve the operation? Did the man who suggested using vaseline on sandpaper disks write a paper to introduce the idea?

Having disposed of the membership clause, the next consideration is the officers. Here I shall offer some suggestions which you may consider radical, but they are based upon the experience of the Minnesota State Society and that of the body already referred to. These bodies, through the power of their constitution and by unwritten laws which have so grown into custom as to appear as though incorporated in the written laws, have operated very closely in line with these suggestions. Under this idea, an executive committee which shall transact all the business of the society is the central figure. This committee should consist of the president, vice-president and three others, with the last two past-presidents as advisory members.

At the time of organization the president, vice-president, secretary, treasurer and the three members of executive board—one for one year, one for two years and one for three years—should be elected. After that one member of the executive board, to serve three years, should be elected each year. The constitution should provide that the vice-president succeed the president; the three-year man, who served that year as master of clinics, succeed the vice-president, and the two-year man become master of clinics, the one-year man becomes secretary of board; then the only officers to be elected would be one member of the executive board, and the secretary and treasurer. This would materially lessen the time consumed in election. It would abolish nominations from the floor by having members declare their candidacy for these three elective offices. I would also abolish all other standing committees.

This plan provides a means for educating your officers, as under it there would never be more than one man on the board of less than one year's experience. Under this plan, no business would be brought before the house until it had been submitted to and acted upon by the executive board. Many matters need never come before the house at all, as they could be justly disposed of by the board. Those matters which are referred to the house for vote should be reported to the house at one session, and voted upon

without discussion, at a subsequent session, and at an hour fixed by the president. This would do away with all tedious time-killing discussion before the house and give every member a better opportunity to vote intelligently, as all would have ample time to acquaint themselves with the merits of the question.

The great object of such a plan is to leave all the time of the society for the presentation of papers and their discussion. That is what the boys from the country come for—not to hear the half-dozen men who always monopolize the floor discuss whether we shall send roses or carnations to the family of a deceased brother, or some equally vital question.

You may object that this involves too much work for a few, and also gives control to a few. Did you ever see a society where a few did not do most of the work or one where the few did not contrive in some way to control its affairs? This plan only acknowledges the inevitable, legalizes it and makes the path smooth.

As you are aware, in many societies the vice-president is little more than a figurehead, whose only opportunity to shine is while the president reads his address. He is usually some member who is known to cherish ambitions that the society deem wise to sidetrack, or one whom they recognize as deserving honors, and so proceed to honor by insulting him with this empty office. True, some societies advance their vice-president to the presidency, but in such cases what training has he for the position? It is often the case, too, that the president has little more responsibility—unless he assume it—than to look wise and preside at the meetings. He should be given power by the constitution to direct the affairs of the society during the whole year of his incumbency and be held accountable for the proper discharge of his duties.

To summarize: The composition of the board should be the president of the society; vice-president, acting as chairman; three-year man, master of clinics; two-year man, secretary of the board; one-year man, learning and helping all he knows how, with the two past-presidents assisting with their counsel and advice based on their years of experience. This, with a secretary, to keep the records and assist the executive board in editing and publishing the proceedings, and a treasurer to collect and disburse, under proper authority, the funds of the society—this would constitute the machinery which is to do the work.

The duties of such board are to provide programs for the meetings, consider the applications for membership, reporting the same at the sessions of the regular meetings, make all arrangements for place of meeting, purchase supplies, audit all bills and draw warrants on the treasurer for their payment. In fact, transact all business, receive all motions, and report for or against them at the next session, to be voted upon without discussion at a subsequent session.

The duties of the members are, first, to see to it that the executive board is made up properly; having done this, give them their unqualified support. You have washed your hands of all business and politics and are free to devote your energies to preparing something which will enable your officers to provide programs which will draw a crowd.

Having proceeded so far with your constitution and by-laws, you may well ask what more is there to legislate? There it is, the whole thing in a nutshell. All those little things which are usually incorporated in laws are referred to your executive board, who are responsible to you for a proper solution of all these problems.

In conclusion, gentlemen, let me urge you to weigh this matter well. That you are all earnest and honest in your determination to make this North Dakota Dental Society a success is a foregone conclusion. The ideas I have advanced are not mine alone; they are shared by many. Many of you have seen the working out of some modification of them, and I feel sure you will all agree that the closer they were followed, the more satisfactory and successful were the meetings.

In the society, as in the world, unhappiness and strife arise from envy and jealousy, and peace and happiness come to him who observes the golden rule and that other command, "Love thy neighbor as thyself." This is the second of the two commandments upon which hang all the law and the prophets.—*Dental Review*.

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A PLEA FOR THE MORE CONSERVATIVE USE OF ANESTHETICS, NARCOTICS AND SEDATIVES IN DENTAL PRACTICE. By C. P. Pruyn, M. D., D.D.S., Chicago, Ill. To assist in the alleviation of pain as a life work has always been considered worthy of the highest efforts of a certain number

of mankind, from the earliest known history to the present day. The middle of the nineteenth century will always be known as marking an epoch in the achievement of this much to be desired condition, especially in surgery. And while we of the present day cannot do too much homage to the names of Horace Wells, W. T. G. Morton and Simpson, the discoverers of the use of nitrous oxid, ether and chloroform, we can hardly imagine how we could get along at the present time without the use of these and kindred agents. But it is the province of this paper to deal with the abuses rather than the rational uses of anesthetics, narcotics and sedatives. The reckless and careless manner in which inexperienced men have used anesthetics in the past has often been more harmful than the shock of the surgical operation. The permanent evil effects of chloroform upon an already weakened heart and arteries, and the irritating effects of ether upon weak lungs and kidneys have often, as you know, been of too serious a nature to justify us in considering the administering of an anesthetic a simple operation. Fortunately, however, during the last few years there has grown up in some of our large cities a class of men known as professional anesthetists, whose specialized work permits of greater proficiency than the general work of the average practitioner. And some surgeons rely wholly upon such men to administer the anesthetic. But even then, with the most scrupulous care, fatal results have sometimes occurred.

The fact that we are recognizing some of the evils arising from our past methods causes one to think we are improving, even though it be slowly. If one of our dentists should be so unfortunate as to have a fatal case of anesthetic narcosis, and should be called up before the court to answer the questions of a sharp, shrewd lawyer, I fear the average man would not acquit himself with glory, judging from the answers received from candidates coming from different States of the Union to procure licenses to practice dentistry before the State Board of Illinois.

The natural conclusion would be that the subject of anesthetics has not been very thoroughly taught, or, rather, the seriousness of the subject has not made a very deep impression upon the minds of such candidates. Only a very few of them could tell how ether or chloroform are made, or from what they are manufactured, or the efficient treatment in case of an overdose of these drugs; and

if this paper should arouse sufficient interest in this subject so that everyone who uses such powerful agents will go home determined to brush up his knowledge of them, so that if called upon before a court of record he might show a familiarity with them under all conditions, this paper will not have been written in vain.

It is generally understood that the highest courts in the land have not passed upon the province of the dentist to administer anesthetics; and some time that will take place; and when it does it is to be hoped we shall be represented by someone who can do credit to himself and the profession of dentistry.

The only safe anesthetizer is the one who always appreciates the gravity of the case in hand, and who feels with each administration that he is taking his patient down very near to the gates of death, and that a little carelessness upon his part may deprive a fellow human being of life, and possibly plunge a whole community in sorrow.

No anesthetic should ever be given without a previous examination of the physical condition of the patient, and then, if the administration is considered advisable, all known restoratives and antides should be within easy reach.

It is said that the unexpected always happens; and if a fatality should occur, and the evidence at the coroner's inquest should reveal a lamentable lack of methods, appliances and restoratives, the court would certainly censure the defendant, and probably hold him over to the grand jury or criminal court for further action. Therefore, too great care cannot be exercised in such cases.

That old trite saying that "Fools rush in where angels fear to tread," can be applied to the administration of anesthetics, fully as well as to any of the branches of the great healing art. Looking backward for a third of a century, to the time when the undergraduate of little education and experience was the anesthetist in most medical and dental schools, and to the meagre instruction given students on this subject, it would seem that the guardian angels must have been hovering around to prevent fatalities. It is a very responsible position for a man to administer a drug to a patient that will suspend animation for a more or less extended period, with the balance of the scales tipping to the death side. The custom of using the hypodermatic needle to inject unknown quantities of unknown drugs into the gums for local anesthesia is

reprehensible. This method has now been employed a sufficient length of time to demonstrate the evil results of such practice. In the first place, it is bad enough to introduce drugs into the human system that we are familiar with, but how infinitely worse is it to do the same with a combination of unknown materials and unknown quantities of the same! We have all doubtless seen cases of serious injury to the jaws from such practice, as well as grave constitutional symptoms that were more or less permanent.

The introduction into the system of septic matter upon the hypodermic needle in the hands of slovenly operators, and cheap advertising dental establishments, has become so apparent that something ought to be done about it in the interest of the general public's protection. But how to go about it, when such men are properly licensed by the authorities of the State is a delicate question, and one hard to solve.

The enormous increase in the use of the coal tar headache cure preparations that are having such a deleterious effect upon the heart's action of the users thereof calls for strenuous action upon our part in educating our patients to know the evils, so they may take due notice and govern themselves accordingly.

Acetanilid and its kindred preparations, if properly used, have a large field of usefulness, but, if abused, they become mighty engines of destruction.

Of course, there are times in our practice when whiskey or even some of the opium preparations or other sedatives, are invaluable, but too great reliance upon such drugs weakens the patient, both physically and mentally, and it behooves us to be on the alert and to know when to give and when to withhold these dangerous drugs.

Pain is an exalted sensation of a normal physiological process perverted, and the beneficence of pain as a warning is too well known to enlarge upon before such an audience as the Illinois State Dental Society. But the great demand for painless dentistry that we encounter every day is having a very pernicious effect upon many dentists, as well as the general public. And while a state of stoicism apparently devoid of sensation or sentiment is not to be desired, nevertheless, the person who can restrain his feelings under great stress and strain without the stupefying effect of narcotics or sedatives is in a much better condition than

the one who has been weakened both physically and mentally by drugs that deaden the sensibilities and render inert one's real strength and stamina.

While cocaine has been a great blessing to mankind, it has also been a great curse, and is becoming more so every day. The facility with which the tooth pulp may be anesthetized and removed, and crown and bridge work substituted for well made fillings and partial plates, affords the dentist an opportunity to display his wonderful skill to the people, and at the same time to reap a rich financial harvest, so that the great majority of the profession have become crown and bridge work maniacs. And now the question arises, what will be the result of all these beautiful gold and porcelain crown and bridge work monuments? Will they stand? Do they stand long enough, commensurate with the labor, nervous strain and expense of their construction? Are the pulp canals always thoroughly treated and filled, so as to avoid future irritation and abscess? Are the bands always properly fitted, so as to avoid chronic gingivitis and recession of the gums, etc., etc.? Are we not ruthlessly destroying a great many pulps that might better be saved, because it is so very much easier and quicker than the conservative method? And in this wholesale pulp destruction, are we not doing our patients permanent harm while doing them temporary good?

I have seen so much injury to the gums, alveolar process and bone, resulting from hypodermatic injections, that I would prohibit the use of cocaine in my office if I thought the trouble arose from the use of cocaine *per se*. But I am of the opinion that the trouble frequently comes from septic matter carried into the tissues beyond by the needle rather than by the irritating properties of the drug itself. A thoroughly aseptic needle may, and often does, carry infectious material from the mouth into the tissues, and thus cause serious trouble. It is a well known fact that infectious material in the mouth, and about the necks of the teeth, is often carried into the general system by the beaks of the forceps in extraction, causing serious trouble. It is also well known that cocaine is a very unreliable drug in its effects upon different individuals. But its injudicious, indiscriminate and improper use has doubtless caused a very large part of the trouble that has been blamed upon the drug itself.

In the early days of cocaine a long series of experiments was made upon some of the lower animals by one of the members of this society, that has been of great value to all who use this drug on the human subject.

The one special point brought out in those experiments was that cocaine should always be administered after a full meal rather than with an empty stomach, as is done with the general anesthetics.

The continued use of cocaine does not cause that "familiarity which breeds contempt," but rather a wholesome respect for and fear of such a dangerous drug. In recapitulation allow me to sound some notes of warning: (1) Do not become reckless and careless in the use of anesthetics; (2) do not use any preparation of drugs to produce local or general anesthesia that you are not familiar with; (3) also, do not use any of the coal tar headache cure preparations or sedatives that you are not familiar with, as they are dangerous, dangerous, dangerous!

This article would not be complete without mentioning the subjects of coffee and tobacco. Statistics show that we consume more coffee per capita than any other people, and while we admit the stimulating properties of coffee, we realize the fact that over-stimulation produces sedation, and that brainworkers and people who live largely indoors do suffer more or less from this cause, and that dentists who have such careful and delicate work to do should be very abstemious in the use of coffee. And if anyone doubts the truthfulness of this statement, let him abstain from coffee for a period of a month and note the improved condition.

All the foregoing statements regarding the use or abuse of coffee will apply equally well to tobacco. The habitual user of tobacco who lives an indoor life will sooner or later, and usually sooner, notice a more or less impaired condition of the heart's action. The special point is this: If the above is true are we justified in using those things that militate against our general health and impair our usefulness? The public, who employ us to care for them, expect us to be at our best physically and mentally. As with other drugs, what may be a small dose of caffein or nicotin to one person, may be a large dose for another one. An old smoker has tersely said, "What a fool I am to smoke several cigars in an evening, and upon retiring feel my heart beating with such difficulty that it interferes with my slumbers; and then in

the morning I have that dark brown taste in my mouth, and a dopy feeling nearly all day, that depresses me, and retards the action of both my brain and body." I feel confident that a large part of this audience can corroborate the utterance of the old smoker.—*Dental Review.*

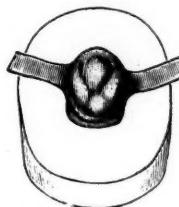
### Clinical Digests.

METHOD OF MAKING AN OPEN-FACE CROWN. By W. E. Dieffenderfer, D.D.S., Washington, D. C. After preparing the tooth in the usual way, a wire measurement is taken and from an impression of the tooth a model is made in plaster (Fig.

FIG. 1.



FIG. 2.



1). Cut away from the cast the adjoining teeth, and with a fine-pointed instrument clearly define the gum line. The wire measure is now placed on the cast, and the tooth trimmed as far as it is intended that the band should reach under the gum.

FIG. 3.

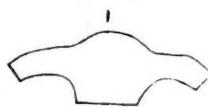
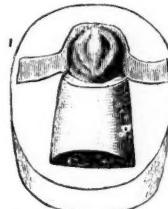


FIG. 4.



Make a die of the whole in Melotte's metal, also a die and counter-die of the lingual aspect of the tooth. A piece of tin foil is cut for a pattern, placed on the lingual surface of the first die (Fig. 2) and burnished into position. The front is then cut

out, allowing for an overlap on the cutting edge, and also for a lapping of the band in front. The gold plate is then cut according to the pattern (Fig. 3) and placed on the second die, representing the posterior surface of the tooth (Fig. 4). This is held on the cast and partly swaged with a horn mallet to prevent the plate from slipping when placed between the die and counter-die (Fig. 5). The swaging between the dies is then finished with a hammer. The back of the crown will now fit accurately, and it should also fit the first die.

The open band is at this stage of the procedure burnished around the front part of the first die, and by holding the back

FIG. 5



FIG. 6.



in position with the thumb it is made to conform accurately to the die. The ends of the band are forged thin at the lap, and the place for the solder is marked. We now have the back of the band fitting the die accurately, with the overlap and the sides of the crown flaring. The flare is now hammered to place, and the crown should fit the die and the plaster cast perfectly. The opening in front is now cut with a stone on the engine, the band is reinforced with 22-k. solder, and the crown is finished in the ordinary way (Fig. 6).—*Dental Cosmos*.

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A METHOD FOR PRODUCING PERFECT JOINTS IN GUM-SECTION PLATES. By R. E. Petty, D.D.S., Charleston, W. Va. Of late years the tendency to discard the gum-sections in artificial dentures seems to be so prevalent that a great many dentists do not use them at all, especially the younger men of the profession. This may be due to the fact that a more artistic assemblage can be secured with plain teeth, and, in many cases, a better articulation with less time. But with such a variety

of good gum-section molds, how much more beautiful for "great exposure" are they than the dirty brown, once pink, vulcanite.

The following is a method by which the joints can be made invisible in the mouth:

This method begins when the case is invested in the first half of the flask, and the plaster investment should only come to the wax border of the plate and in no case extending onto the wax.

Cut strips of tin foil No. 40 for each joint, making them one-fourth of an inch wide and one and a half inches long, and lay them over the joints, beginning on the labial surface of the front joint one-fourth of an inch below the porcelain and lapping the end over the cutting edge of the incisors onto the palatine surface of the wax. Burnish the foil well on to the teeth and over the joints. After each joint is so protected, pour the opposite side of the flask.

Heat the flask in boiling water for three minutes and separate. Remove the wax which will expose both ends of all the foil strips. Mix a thin cement and place on lingual surface of each joint, press the ends of the foil over the cement and joint.

Pack and vulcanize as usual, and on the removal of case from the flask thoroughly wash and dry. Then remove the tin foil and the joints will be just as clear from coloring matter as they were when assembled on the articulator.

Dry the joints and slightly warm them, and with the wax spatula drop some hot wax onto and over each joint. This will better protect them from dirt while finishing than foil.

I have experimented with tin foil and cement for two years, using different thicknesses, and I find No. 40 foil best suited for the purpose. The entire method only requires a few minutes of time and the results will be very gratifying.—*Dental Register*.

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A UNILATERAL LOWER DENTURE. By F. L. Platt, D.D.S., San Francisco. One of the most difficult tasks in prosthetic dentistry is to construct a partial denture to supply the loss of the molars, or molars and bicuspids, on one side of the mandible only. This may be done in the following manner: A case presented with all the lower molars and second bicuspid missing on the left side. To secure the partial denture the "Morgan System of Removable Bridge Work" was employed

The lower right first molar and second bicuspid were fitted with gold crowns, as was also the lower left first bicuspid, and an impression taken and model made with these crowns in position, as in making ordinary bridge work. A heavy flat gold bar, made of clasp metal covered with 22-k. solder, was fitted, extending from the molar on the right side to about three-quarters of an inch beyond the bicuspids on the left side.

This was bent so that it lay below the gingival border of the gums and not touching them on the lingual side of the teeth, the end projecting beyond the bicuspids being used to support the vulcanite saddle containing the artificial teeth.

To the molar and bicuspid on the right side was soldered a "keeper" of the Morgan system, fastening these crowns together, and to the bicuspids on the left side was soldered a second "keeper." To the end of the bar and to the part resting against the bicuspids were soldered the "anchors" fitting into the "keepers" on the crowns. The crowns and bar were then placed in position in the mouth, an impression and bite taken and a vulcanite saddle containing a bicuspid and two molars made and vulcanized to the projecting end of the bar. The three crowns were cemented at one time, the bar and saddle being placed in position before forcing the crowns fully into place, thus preventing the crowns from shifting and so spoiling the fit of the bar and saddle.

This device is firm and secure and can be easily removed and replaced. It is now, six months after construction, giving entire satisfaction and the patient experienced no difficulty in becoming accustomed to it.—*Pacific Dental Gazette*.

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ACONITE AND CHLOROFORM.—Dr. Louis Jack, in a paper read before the New York Stomatological Society and printed in the *Journal*, says that after capping a pulp there is sometimes a tendency to pain in the immediate region, which is also often reflected to the ear, and a decided reaction to cold applications. In such cases, dry the gum tissue and rub away adhering mucus and apply on a pledget of cotton, for from fifteen to twenty seconds, a lotion made of one part chloroform and two parts of aconite. The action of the chloroform is to accelerate the absorption of the aconite, which depresses the sensory nerves and equalizes the blood pressure at the apical region. The chloroform also acts as a counter-irritant primarily with a secondary sedative reaction. Such applications have an endurance of several hours, or, in some cases, for one or two days.—*Dental Register*.

# The Dental Digest.

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## Editorial.

### IS THE DENTAL PROFESSION ADVANCING FROM A LITERARY POINT OF VIEW?

Is dentistry to remain a profession or is it doomed to degenerate into mere artisans' work? At first thought these may seem absurd questions, but the more we ponder the trend of dentistry as now being taught, the more we see that the questions are not irrelevant.

A careful investigation of the literary product of the dental profession for one lifetime does not, in our judgment, show that we are advancing. As an example let us examine the papers and discussions of dental societies during the last thirty-five years. This will show that the same writers or older practitioners have furnished most of the material that is of interest. Delving still deeper we do not find that the results of original research have come from the younger members, neither do they give much proof of having grasped the scientific and literary aspects of the dental profession, nor are they well posted as to what other men have done, all of which goes to prove that they do not read or study such subjects.

From a professional as well as journalistic point of view this is a serious question. There are any number of journals ready and anxious to publish good papers and discussions. There are dental societies without number holding meetings and the recorded proceedings are published in some one or more of the dental journals, so that opportunities for examination of the literary products of the dental profession are easily afforded, and the result of such examination serves as our authority for this statement, that instead of improving we are degenerating.

Granting these propositions to be true, and we do not think they can be successfully controverted, it might be well to look for the

cause of this deficiency and, perhaps, suggest remedies. In former years when schools were not so abundant or so well equipped, students entering the dental profession had to do more individual studying. In order to acquire the necessary knowledge they were obliged to read and study what other men had done, and work out for themselves what is now put before the students by the teacher and demonstrator, this latter method apparently making it easy for the young men to equip themselves for practice.

These methods serve as illustrations of different phases of life that may be seen anywhere. Children brought up in luxury and having everything that luxury affords are handicapped when entering the struggle of life for themselves by the fact that they have never been compelled to really exert themselves and develop their own talents. On the other hand, the poor children who have been obliged by necessity to struggle and develop their intellects without luxuries and by personal effort only, very frequently forge to the front and become the leading citizens. This is true in practically every sphere of work and we believe the same line of reasoning will prove true in regard to the education of the dental student.

This then leads to the next proposition, and that is technique work. If we understand the situation correctly, the rule is to give the student technique work on his first entrance to the school and thereby inculcate or increase manipulative skill. This work speedily becomes fascinating, and since, in our opinion, this is what the newly entered student desires most, that is, to learn to manipulate on models, or even more, on living subjects, his whole attention, or too large a share of it, is devoted to this technique work and he loses what is most important in the first year of a student's life, and that is intellectual study.

Granting a large measure of truth to these statements, would it not be wise, then, to alter the order of things and not allow technique work to enter into the time the student gives to the first half of his college education, thereby encouraging and deepening the aptitude for study, which, when well instilled into the mind, is more than likely to become habitual through his after life when in practice? Under the present system of allowing the student to undertake technique work early, he, to an extent, ceases to be a student in the true sense of the term, and only studies enough to be enabled to answer the questions necessary to pass his examinations,

instead of sounding the depths of his subjects, becoming interested in them and making them part of his life's work.

This disposition and habit of study needs encouraging for still another reason. When the graduate enters into practice, if he is successful, his time and energies are very much taxed and, therefore, if he has not already acquired that love for study so necessary he is liable to neglect it entirely and so become as many of the present-day practitioners, simply working machines, without the ability to reason logically and study out the real duties they should perform.

It is taken for granted that our position, as outlined in our editorial of last month on this phase of the subject, cannot well be controverted, and we repeat that it is the educated man, the student, who is the one best equipped to diagnose each and every case and realize what should be done, this being the first and most important part of a practitioner's duty. Again, can our profession reasonably be recognized as one of the learned branches if the greater part of students' training consists in manipulative skill rather than along broad intellectual lines? Education, broadly speaking, does two things for a man—enlarges his life by adding to it the experiences, discoveries and researches of other men, and develops in him that most needed of all qualifications—the judgment and wisdom to meet and solve life's problems and emergencies.

As another proof of the correctness of our stand in this matter we cite the fact that in order to get members of the profession to attend dental society meetings it is necessary to have a very large proportion of the proceedings as clinics and demonstrations of technique work. Any observant committeeman who has been trying to organize and ensure a successful meeting will agree with this statement, that in order to get the crowd to attend there must be these clinical demonstrations, which goes to prove that the average dentist is much more interested, if not wholly so, in technique rather than scientific work. It is not our intention or disposition to decry manipulative skill, and we believe that this faculty is very highly developed in the average graduate. We do believe, however, that some of this technique teaching is superfluous. For instance, it will be demonstrated to you how cusp forms can be carved on teeth in models, which, by the way, is a waste of time and almost utterly useless in practical work, for if we are inserting crowns or making large occlusal restorations, the natural occlusion of the opposing

teeth must determine the form of the cusp in the artificial work, and, therefore, this great display of ability to carve cusps in unbaked material is folly, insofar as usefulness is concerned, and a waste of time, and if time is an object it might be very much better used in doing practical things or in studying the science of dentistry.

We have given this much space to the discussion of this important subject, believing that it is the most serious problem now confronting the dental profession and one which must be remedied if we are to occupy our legitimate position as a learned profession.

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### In Memoriam.

CHARLES RICHARD TAYLOR, D. D. S.

Died—At his residence in Streator, La Salle County, Ill., of typhoid fever, September 13th, 1906, Dr. C. R. Taylor, in the fifty-eighth year of his age.

Dr. Taylor was born November 11th, 1848, near Folkestone, in Kent, England. His parents came to this country in 1852 and located at Derby, Conn. In 1858 they moved to Illinois. He grew up on a farm and received his early education in a country school. After various business experiences he took up the study of dentistry and attended the Philadelphia Dental College, from which he graduated in 1876. He was the president of his class. In 1877 he located in Streator, where he practiced till the time of his death.

In 1879 Dr. Taylor was married to Miss Jennie Phelps, of Sandwich, Ill., who, with one daughter, Vera, survives him.

At the time of his death Dr. Taylor was a life member of the Illinois State Dental Society, a member of the Illinois State Board of Dental Examiners, the La Salle County Dental Society, and the Streator "Fellowship Club," the latter a society organized by himself to promote the good fellowship and professional success of its membership, and that included all the reputable dentists in Streator. He was also instrumental in organizing Fellowship Clubs in many towns in Illinois and other states.

He was a Royal Arch Mason, a member of the Delta Sigma Delta Fraternity, Modern Woodmen of America, Streator Club and the Church of Good Will.

The esteem in which he was held at home is shown by the tribute to his memory in the local press, some portion of which is appropriate here :

"With the passing of Dr. Charles R. Taylor we lose our most public-spirited citizen. Not that he was most conspicuously identified with prominent affairs or stood forth in the limelight of publicity; not that he was aggressive, dominating or assertively constituted, for he was none of these. But in quiet, persistent, unassuming ways, in doing unasked commonplace work, laborious work, much of it, in loyalty to unpopular ideals, in warm-hearted breadth of vision and quick responsiveness to demands on his purse, time and energies, Dr. Taylor embodied many of the splendid qualities of the coming man, the man vitalized by a social purpose.

"He was catholic in his large tolerance, winning in his genial ways with men, and so he lived among us, doing so cheerfully, so modestly, so patiently and lovingly his share in the social, business and family relations which make for social harmony and order, that we scarce realized how much his services meant to this community.

"In many respects his passing is not sad, for he left so much behind. He did not live a long life, but a full life. He has not gone far away, but only passed on to larger spheres of service, leaving behind a wealth of fine memories, tender sympathies, noble deeds, loving acts, kind looks, hearty fellowship and 'good will to men.' "

In the Illinois State Dental Society he was much loved and honored. He was president in 1897 at Peoria. An uncompromising disapproval of everything untrue, mean and selfish gave to his speech at times a complaining, almost a scolding, tone, and so tended to create an impression that his disposition was stern and rather pessimistic, but when he came to the annual meeting one year with all but one of the dentists from Streator we began to realize better the sweetness and loveableness of his nature and his power to attract and influence people. These aspects to his character grew more and more apparent to us till the end, and now, when he has passed to the Great Beyond, we understand more fully how true he was to his ideals, especially those which tended to the uplifting of his chosen profession, and realize how much the profession, as also our State Society, need such men.

[REDACTED]

## Notices.

### NORTHERN ILLINOIS DENTAL SOCIETY.

The annual meeting of the Northern Illinois Dental Society will be held at Aurora, October 17th and 18th, 1906. A good program is assured. Come prepared to contribute something toward the success of the meeting.

A. M. HARRISON, Secretary, Rockford, Ill.

### BUFFALO DENTAL ASSOCIATION.

At the annual meeting of the Buffalo Dental Association held at Grand Island, the following officers were elected for the ensuing year: President, Charles A. Bradshaw; Vice-President, Charles K. Buell; Recording Secretary, F. Hicks Underwood; Corresponding Secretary, F. S. Garrett; Treasurer, L. W. Robinson.

### CONNECTICUT ODONTOLOGICAL SOCIETY.

At the sixth annual meeting of the Connecticut Odontological Society held at Savin Rock, July 11-12, 1906, the following officers were elected for the ensuing year: President, A. H. Wile, Hartford; Vice-President, M. C. Hitchcock, Ansonia; Secretary, G. H. Neubauer, Bridgeport; Treasurer, F. L. Uhle, Bridgeport; Executive Committee, F. C. Jackson, Norwich; C. A. Ryder, Bridgeport, and G. H. Henry, Hartford.

### PENNSYLVANIA STATE DENTAL SOCIETY.

At the thirty-eighth annual meeting of the Pennsylvania State Dental Society held June 26th, 27th and 28th, 1906, at Philadelphia, the following officers were elected: President, J. T. Lippincott, Philadelphia; First Vice-President, P. K. Filbert, Pottsville; Second Vice-President, C. B. Bratt, Allegheny; Recording Secretary, L. M. Weaver, Philadelphia; Corresponding Secretary, V. S. Jones, Bethlehem; Treasurer, W. A. Spencer, Carbon-dale; Board of Censors, C. C. Walker, Williamsport; E. W. Bohn, Reading; W. H. Fundenberg, Pittsburg; W. C. Scott, Lansford, and J. F. Kingsley, Towanda.

### INDIANA STATE DENTAL ASSOCIATION.

The forty-eighth annual meeting of the Indiana State Dental Association was held at West Baden, June 26th, 27th and 28th, 1906, and the following officers were elected for the ensuing year: President, A. T. White, Newcastle; Vice-President, R. A. Adams, Clinton; Secretary, D. E. Lucas, Indianapolis; Treasurer, C. W. Throop, Muncie; Executive Committee, P. H. Chadwick, Rushville; Supervisor of Clinics, C. A. Barnhill, Indianapolis; Trustees, S. W. Van Osdol, Mitchell; O. U. King, Huntington, and B. F. Williams, Terre Haute. Indianapolis was selected as the place for the annual meeting in 1907.

**STATE OF MICHIGAN BOARD OF EXAMINERS IN DENTISTRY.**

The next regular meeting of the Michigan Board of Examiners in Dentistry will be held at the Detroit College of Medicine, October 24-27, 1906.

Three Rivers, Mich.

ALBERT L. LEGRO, *Secretary.*

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**UTAH DENTAL ASSOCIATION.**

At the sixteenth annual meeting of the Utah Dental Association held at Ogden, June 21-23, 1906, the following officers were elected for the ensuing year: President, Fred Meakin, Salt Lake City; First Vice-President, J. F. Snedaker, Ogden; Second Vice-President, Joseph Grant, Kaysville; Secretary-Treasurer, L. E. Arnold, Salt Lake.

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**COLLEGE OF DENTAL SURGEONS OF PROVINCE OF QUEBEC.**

The annual meeting of the College of Dental Surgeons of the Province of Quebec was held September 19, 1906, at Laval University, Montreal, and the following officers were elected: President, L. N. Lemieux, Quebec; Vice-President, J. G. Gardner, Montreal; Secretary, Eudore Dubéau, Montreal; Treasurer, C. F. Morison, Montreal; Registrar, J. G. A. Gendreau, Montreal.

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**DENTAL ASSOCIATION OF THE PROVINCE OF ALBERTA.**

The annual meeting of the Dental Association of the Province of Alberta was held at Banff, Alta., July 12th, 1906. All the officers were re-elected for another year. They are as follows: President, R. B. O'Sullivan, Calgary; Vice-President, A. E. Auger, Lacombe; Secretary-Treasurer, O. F. Strong, Edmonton; E. Doyle, Calgary, and T. C. Bruce, Macleod, were elected to the Board.

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**NORTHERN INDIANA DENTAL SOCIETY.**

The 18th annual meeting of the Northern Indiana Dental Society was held at Hammond, Ind., September 18 and 19, 1906. The following officers were elected for the ensuing year: President, F. N. Bozer, Logansport, Ind.; Vice-President, S. A. Bell, Hammond, Ind.; Secretary, W. R. Meeker, Peru, Ind.; Treasurer, J. A. Dinwiddie, Lowell, Ind.; Supervisor of Clinics, A. Richard Ross, Lafayette, Ind. The next meeting will be held at Peru, the last week of September, 1907.

W. R. MEEKER, *Secretary,*  
Peru, Ind.

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**SOUTH CAROLINA STATE DENTAL ASSOCIATION.**

At the thirty-sixth annual meeting of the South Carolina State Dental Association held June 26th, 27th and 28th, 1906, at the Isle of Palms, the following officers were elected: President, J. H. E. Milhouse, Blackville; Vice-Presidents, T. T. Moore, Columbia, and E. J. Etheredge, Leesville; Corresponding Secretary, L. N. Kibler, Prosperity; Recording Secretary, R. Atmar Smith, Charleston; Treasurer, Wm. S. Brown, Charleston, and Chairman of Examining Board, G. F. E. Wright, Georgetown. The Association meets next year at Anderson.

**MAURY COUNTY (TENN.) DENTAL ASSOCIATION.**

At the annual meeting of the Maury County Dental Association, held September 6, 1906, the following officers were elected: President, F. S. Osborne; Vice-President, W. G. Merrill; Secretary and Treasurer, J. E. Sheppard.

**CANADIAN DENTAL ASSOCIATION.**

At the annual meeting of the Canadian Dental Association, held at Montreal, September 5, 6 and 7, 1906, the following officers were elected: President, A. R. McInnis, M. L. A., Brandon, Man.; Vice-President, James M. Magee, St. John, N. B.; Secretary-Treasurer, W. J. L. Spaulding, Toronto, and Registrar, E. Doyle, Calgary.

**NATIONAL ASSOCIATION OF DENTAL FACULTIES.**

The annual meeting of the National Association of Dental Faculties was held at Atlanta, Ga., September 14, 15 and 17, 1906, and the following officers were elected for the ensuing year: President, J. I. Hart, Milwaukee, Wis.; Vice-President, Frank Holland, Atlanta, Ga.; Secretary, George E. Hunt, Indianapolis, Ind.; Treasurer, H. R. Jewett, Atlanta, Ga.

**NORTHERN IOWA DENTAL SOCIETY.**

At the annual meeting of the Northern Iowa Dental Society, held at Cedar Rapids, September 11, 12 and 13, 1906, the following officers were elected for the ensuing year: President, J. D. Welsh, New Hampton; Vice-President, C. N. Booth, Cedar Rapids; Secretary, H. P. White, Sioux City; Treasurer, F. D. Miner, Oelwein. The next annual convention will be held in Sioux City, May 7, 8 and 9, 1907.

**NEBRASKA STATE BOARD OF DENTAL EXAMINERS.**

The next meeting of the Nebraska State Board of Dental Examiners will be held at the State House, Lincoln, Neb., on the 12th, 13th and 14th of November, 1906, for the examination of applicants to practice dentistry in Nebraska.

For further information, address

C. F. LADD, *Secretary,*  
1241 O St., Lincoln, Neb.

**FOX RIVER VALLEY DENTAL ASSOCIATION.**

The Fox River Valley Dental Association held its fifth biennial meeting at Green Bay, Wis., September 11, 1906, and the following officers were elected: President, L. H. Moore, Appleton; Vice-President, J. J. Geary, Oshkosh; Secretary, Mary G. Hastings (re-elected), Oshkosh; Treasurer, George Massart, Appleton. G. A. Stratton, Oshkosh, was elected a member of the Board of Censors, and W. G. Weise, Fond du Lac, a member of the Board of Trustees. The next meeting will be held at Appleton, second Tuesday in March, 1907.

## STATE OF CONNECTICUT DENTAL COMMISSIONERS.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford on November 7, 8 and 9, 1906, to examine applicants for license to practice dentistry and for the transaction of other business proper to come before said meeting.

All applicants should apply to the Recorder for proper blanks and rules for conducting the examination. Application blanks must be filled in and sworn to, and, with fee, filed with the Recorder on or before November 1, 1906. By order of Commission. GILBERT M. GRISWOLD, Recorder,  
783 Main St., Hartford, Ct.

## NATIONAL DENTAL ASSOCIATION.

At the tenth annual session of the National Dental Association, held at Atlanta, Ga., September 18 to 21, 1906, the following officers were elected for the ensuing year: President, A. H. Peck, Chicago, Ill.; Vice-President for West, D. J. McMillen, Kansas City, Mo.; Vice-President for East, George E. Hunt, Indianapolis, Ind.; Vice-President for South, George S. Vann, Gadsden, Ala.; Recording Secretary, Chas. S. Butler, Buffalo, N. Y.; Corresponding Secretary, Burton Lee Thorpe, St. Louis, Mo.; Treasurer, A. R. Melandy, Knoxville, Tenn. Executive Council: H. J. Burkhart, Batavia, N. Y.; J. Y. Crawford, Nashville, Tenn.; Chas. McManus, Hartford, Conn.; F. O. Hetrick, Ottawa, Kan.; B. Holly Smith, Baltimore, Md. Executive Committee: C. M. Work, Ottumwa, Ia.; V. H. Jackson, New York City, N. Y.; Thomas P. Hinman, Atlanta, Ga. The next meeting will be held in Minneapolis, July 30, 1907.

BURTON LEE THORPE, *Corresponding Secretary.*

## LATEST DENTAL PATENTS.

- 826,629. Cord-suspension electric dental engine, John V. Trenaman, New York.
- 826,818. Dental tool, James H. Abbott, Philadelphia, Pa.
- 826,922. Tongue support, Elmer E. Davis, Los Angeles, Cal.
- 826,977. Dental swaging device, George J. Weber, Liberty Center, Ohio.
- 827,236. Combined rubber dam clamp and holder, Harald J. Hansen, La Crosse, Wis.
- 827,308. Tooth-brush holder and sterilizer, David M. Hitch, Lansdowne, Pa.
- 827,507. Dental instrument, Lyter H. Crawford, Dallas, Texas.
- 827,508. Dental swaging instrument, Lyter H. Crawford, Dallas, Tex's.
- 827,121. Tooth-cleaning device, Patrick F. Roach, Westfield, Mass.
- 827,693. Hypodermic syringe, Frederick W. Korb, Cleveland, Ohio.
- 827,824. Dental articulator, Frederick W. Stephan, Chicago, Ill.
- 827,965. Tooth-brush, Gregor Engel, Charlottenburg, Germany.
- 828,109. Apparatus for stamping and shaping dental metal crowns, Adolf Grumstein, Budapest, Austria-Hungary.
- 828,146. Forceps, James Somers, San Juan, Cal.

## News Summary.

HENRY P. GRISWOLD, a dentist of Rochester, N. Y., died Sept 12, 1906.

MICHAEL J. O'SULLIVAN, a dentist of Worcester, Mass., died Sept. 5, 1906.

SELBY CONDIT, 29 years of age, a dentist of Champaign, Ill., died Sept. 2, 1906.

W. B. SPENCER, 60 years old, a dentist of Jackson, Tenn., died Sept. 20, 1906.

DWIGHT M. CLAPP, 60 years old, a dentist of Boston, Mass., died Sept. 18, 1906.

WESLEY SLOAN, 53 years old, a dentist of Peoria, Ill., died of typhoid fever, Sept. 2, 1906.

T. J. J. MEDER, 36 years old, a dentist of Louisville, Ky., died of heart disease, Sept. 11, 1906.

JOSEPH HEISS, 83 years old, a dentist of Kensington, Pa., died from general debility, Sept. 9, 1906.

CALVIN C. G. SCHOMO, 39 years old, a dentist of Hamburg, Pa., died of typhoid fever, Sept. 13, 1906.

MORRIS A. ANGLIM, 35 years old, a dentist of Bay City, Mich., fell from a third floor window and was killed Sept. 17, 1906.

CHARLES R. TAYLOR, 58 years old, a dentist of Streator, Ill., and a member of the Illinois State Board of Dental Examiners, died of typhoid fever, Sept. 13, 1906.

**FIRE**.—D. W. Olney, New York, N. Y., Sept. 12, loss trifling, fully insured.

**GOLD INLAYS**.—A dull finish, such as is imparted by pumice, is the best for gold inlays.—T. P. HINMAN, *Items of Interest*.

**FATALITY**.—Sept. 11 a woman whilst in a dentist's chair at Rockford, Ill., succumbed to a second administration of chloroform. The dentist was placed under arrest.

**PREVENTION OF RUST**.—Instruments of polished steel if kept in a 2 per cent. solution of either the carbonate, bicarbonate or borate of sodium, or benzine will remain indefinitely free from rust or corrosion.—*Medical World*.

**POLISHING AN INLAY**.—When grinding or polishing an inlay, always do so toward the margins, as this will have a burnishing tendency and produce a neater and more perfect margin.—THOS. P. HINMAN, *Items of Interest*.

**SENSITIVE CAVITIES IN CHILDREN'S TEETH**.—Some of the softened dentin is first excavated and then a mixture of equal proportions of Fletcher's dentin and nitrate of silver is placed in the cavity, which has been previously dried. At the next visit it is quite easy to excavate the cavity.—H. W. NORMAN, *Dental Record*.

CARE OF THE HANDPIECE.—Disconnect the handpiece and dip it in a jar of alcohol containing 10 per cent. eucalyptus oil. That is the best solution for the purpose.—L. M. MARKHAM, *British Dental Journal*.

CEMENTING INLAYS.—To maintain pressure on inlays in proximal cavities until the cement crystallizes, spring a piece of nursing bottle tubing between the teeth. Allow it to remain until the cement has set.—OLIVER MARTIN, *Review*.

EXTRACTING TEETH.—Frequently teeth can be extracted absolutely without pain by the injection of a normal salt solution. We get the psychical effect and in addition quite a little anesthetic effect.—ARTHUR D. BLACK, Chicago, *Dental Review*.

TO SOFTEN CALCULUS.—Before removing salivary or serumal calculus, it will be found advantageous to apply tincture of iodin. A few treatments of this will tend to disintegrate the deposit, and thus facilitate its removal.—E. M. S. FERNANDEZ, Chicago.

TO PRESERVE RUBBER.—One part of ammonia in ten to twelve parts of water will preserve soft rubber. Dip rubber pipes, etc., in a glass jar filled with this solution. For the ammonia bottle use a rubber stopper; it is better than a glass one.—*Cosmos*.

REPAIRING GOLD CROWN.—To repair a gold crown that has a hole worn through it, drill out the hole, parallel the side walls with good cement, make a matrix of platinum and make a gold inlay. Cement to place and finish.—DR. H. H. GANTZ, Albia, Iowa.

ACCIDENTS.—Sept. 14, owing to his vulcanizer exploding, W. E. Gorham, a dentist of Wiscasset, Me., was seriously injured and his office damaged.—Sept. 20, Dr. Cress, a dentist of Sac City, Ia., was badly burned, through his hand coming into contact with a live electric wire.

MISLEADING.—Minister—Deacon Jones, will you lead us in prayer?  
The deacon snores peacefully.

Minister (loudly)—Deacon Jones, will you please lead?

Deacon Jones (waking suddenly)—It ain't my lead; I just dealt!

THYMOL IN TREATMENT OF ABSCESSSES.—Thymol is very insoluble under ordinary circumstances, but it dissolves in oil of eucalyptus, when it becomes a valuable agent in the treatment, especially of the mild forms, of chronic blind abscesses.—GEO. W. COOK, *Western Dental Journal*.

CARBOLIC ACID IN THE PREPARATION OF CAVITIES.—Wiping a cavity with an alcohol-saturated solution of carbolic acid will show very clearly whether all carious tissue has been excavated, and will bring out in relief, so to speak, some crevice that might otherwise possibly be overlooked.—*Dentist's Magazine*.

ASSAULTS.—Sept. 15 an Indiana Harbor dentist was fined \$5 for assault. It is alleged that he was discovered by a mill hand in a compromising situation with the latter's wife, after which discovery the assault was committed.—Sept. 10 a dentist of Nevada, Mo., shot and killed his step-brother. The doctor surrendered and was lodged in jail.

BREACH OF PROMISE.—Sept. 8 a widow commenced an action for breach of promise against a dentist of St. Louis, Mo., stating that matters had gone so far that the wedding rings had been purchased, and that she considered \$10,000 were necessary to heal the breach.

CAVITY VARNISH.—*Pinus silvestris* gum, commonly known as "fiddle-box resin," possesses antiseptic properties from the essential oils contained therein, and is most congenial to traumated dentin recently wounded by excavation.—BURTON LEE THORPE, *L'Odonto Stomatologia*.

CANKER SORE MOUTH.—I have found the full strength aromatic sulphuric acid almost a specific for this condition. I prescribe internally tincture of ferric chlorid gtt. v.; potassium chlorate gr. iii.; water  $\frac{1}{2}$  oz. every three hours in lemonade.—J. E. POWER, *Tri-State Dental Journal*.

NICKEL-PLATED PARTS.—One of the best methods known for keeping bright the nickel work about the office is to wet a rag with a solution of hyposulphite of soda, and wipe the article with it, drying with a soft towel, and then rubbing it with a piece of chamois.—*Bulletin*.

OPENING LARGE CAVITIES.—Employ a chisel and hand mallet to break down enamel walls. A slight tap will accomplish what would otherwise require much hand pressure, and without so much danger of the chisel slipping and injuring the soft tissues.—OLIVER MARTIN, *Review*.

COCAIN HABIT IN INDIA.—According to a Reuter message from Simla, Mr. E. N. Baker has introduced a bill into the Council, proposing the curtailment of the sale of cocaine in India, on the ground that the cocaine habit at present constitutes a serious danger to the country.—*Brit. Dent. Jnl.*

RUBBER HEATER.—A common brick is the best thing to warm rubber on before packing. It holds heat a long time, and the rubber will not stick to it. Don't get a smooth one, just a common red brick, and you will wonder why such a good thing wasn't found out before.—O. B. BRIGHAM, *Am. Dent. Jnl.*

ILLEGAL PRACTITIONER.—Sept. 13 a dentist was arrested at Springfield, Mo., charged with violating the dental laws of the state. He was admitted to bail on \$200, which was signed by a dozen prominent fellow-practitioners. The trial will take place in November, but what the exact offense is, has not been made known.

SOAP STONE.—For heating rubber for packing a case I use a common soapstone with a handle, such as can be found in any hardware store, commonly called a foot-warmer, which can be cut to the size you wish. They will hold heat much longer than needed, and can easily be cleaned with a piece of sandpaper.—H. E. DAVIS, *Review*.

STERILIZING INSTRUMENTS.—I use equal parts of alcohol and formalin for sterilizing all sharp instruments. If left in this solution for five or ten minutes, they will be perfectly sterile and not harmed by corrosion. Other instruments I first scrub with Sapolio and then boil in soft water, with a little soda in it.—W. H. WHITSLAR, *Summary*.

To POLISH A PORCELAIN CROWN OR TOOTH THAT HAS BEEN GROUNDED.—Make a very soft paste of a saturated solution of spirits turpentine, gum camphor and pumice flour. Keep your polishing wheel wet with this mixture while repolishing the tooth. You will be pleased with the result. W. H. SPAULDING, *Dental Summary*.

RETENTION OF DENTURES.—If possible, two roots should be left in each jaw and utilized to support the plate. A satisfactory method is to fit each such root with a gold cap and tube, into which fit a pin attached to the plate. The stability which even one root so treated will give to an entire denture is surprising.—WM. M. GABRIEL, *Dental Record*.

To CEMENT ARSENIC IN CAVITY WITHOUT PRESSURE.—Mix the cement rather thin and place a small drop on a small bit of paper and carry the paper to the cavity with the pliers. Press to place with a burnisher. The paper facilitates adjustment to place and prevents cement adhering to instrument.—C. B. WARNER, Avon, Ill., *Tri-State Dental Quarterly*.

SENSITIVE CAVITIES.—For sensitive cavities, previous to excavating, I have found an application of the following very effective: Zinc iodid crystals,  $1\frac{1}{2}$  grs.; iodid crystals, 2 grs. Make a solution of this in glycerin. Wind a small pellet of cotton on the end of a broach, dip it in the solution and apply it to the decay. For removing the stain use peroxid of hydrogen.—E. M. S. FERNANDEZ, *Review*.

PROTECTION FOR PORCELAIN DURING SOLDERING.—When circumstances make it necessary to nearby soldering to invest crowns or bridges porcelain-face up, cover the porcelain with thin asbestos paper saturated with the investment mixture, catching the free ends in the body of the investment proper. The paper protects throughout the operation from the direct action of the flame.—*Office and Lab.*

PROTECTING THE GOLD MATRIX FROM FUSING.—It is not necessary that any matrix be invested; when gold is used it is protected from fusing by coating it, preferably, with rouge because of its great fineness and affinity for a smooth surface. The rouge is bought in powder and spatulated with alcohol and water. It will resist heat to an astonishing degree.—W. A. CAPON, *Items of Interest*.

TOOTHACHE.—A small amount of acetanilid put in the hollow of an aching tooth will quickly relieve it. Guaiacol is superior to acetanilid for toothache, and should always be used in place of acetanilid, when on hand.

Coffee is a good antidote for acetanilid. This should be mentioned to patients when prescribing it, as it may prevent much harm, and save life.—DR. J. A. BURNETT, *Medical Brief*.

TOOTH DESICCATION.—For desiccating the dentin I use a hot-air syringe whose chamber is filled with carbon, which only requires a few minutes over a Bunsen flame to get the requisite amount of heat. With this attached to the compressed air apparatus the flow of air can be so regulated that the tooth will be thoroughly dry in from one to five minutes.—R. O. SADLER, *Dental Cosmos*.

CARE OF TOOTHBRUSH.—The toothbrush may be kept sterile by taking a large size test tube and constricting it about one inch from the bottom, providing it with a rubber cork as a stopper and placing a little formalin tablet or formaldehyd in the lower chamber and the brush in the upper chamber. It will then become sterile without injury to the brush.—*Dental Review*.

SODIUM DIOXID.—Sodium dioxid is chiefly employed in dentistry as a bleaching agent, but will, through its alkaline and caustic properties, obtund sensitive dentin. The only safe way to use sodium dioxid for either purpose is to make a saturated solution in water, as much heat is generated, sometimes accompanied by ignition, when the dry powder is brought in contact with moisture in a tooth.—*Brief*.

ESTORAL.—This body is the boracic-acid tester of menthol. It forms a white crystalline powder with a feeble odor of menthol. It is stable when dry, but in contact with liquids it rapidly breaks down into its constituents. It is a useful form of administering menthol, but should be mixed with an equal weight of milk-sugar, as otherwise the liberation of pure menthol may burn the mucous membranes.—*Brit. Dent. Jnl.*

TO SELECT PROPER SHADE OF CEMENT.—To ascertain the effect of a certain color of cement will produce on an inlay, mix the powder with water, place it in the cavity and force the inlay to place over it. This gives the same effect in appearance as mixing with phosphoric acid. In this way a test may be made before the actual setting and the correct shade of cement powder selected.—F. E. CHEESEMAN, *Dental Review*.

CAVITY LINING.—When fillings of gold and alloy approximate in adjoining cavities in vital teeth, a galvanic current is often produced, causing continual irritation. This electrolytic action may be greatly modified by varnishing the cavities just prior to inserting the filling material. Absolute dryness of the cavity is essential, that the lining material may form a close union with the cavity wall.—BURTON LEE THORPE, *Dentist's Magazine*.

DIVORCES.—Early in September Mrs. Mabelle Miller commenced divorce proceedings against her husband, H. L. Miller, a dentist of Otsego, Mich., alleging unfaithfulness.—During September Mrs. Gertrude White instituted divorce proceedings against her husband, Robert White, a dentist of Frankton, Ind.—During September Linda W. Carmichael sued for a separation from her husband, B. F. Carmichael, a dentist of Schenectady, N. Y., on the grounds of inhuman treatment.

WARMING THE HIGH PRESSURE SYRINGE.—Before using the high pressure syringe it will be found advantageous to warm both syringe and solution by passing the syringe through the flame of an alcohol lamp. By taking this precaution, it will be found that there will seldom be any pain when pressure is placed upon solution the first time. Frequently the unpleasant sensation occasioned when we first begin to inject into the initial pit, is caused by the application of either the cold instrument or the cold solution.—*Dentist's Magazine*.

MATERIAL FOR FILLING CHILDREN'S TEETH.—For children's teeth, or other wholly or partially submarine work, the following formula is recommended:

No. 10 gold, No. 10 tin.—Gold and tin in equal parts; folded and cut in strips.

No amalgams will work easier and no filling of any material whatsoever will approach it as a toothsaver under like conditions.—J. R. CALAHAN, Cincinnati, *Dental Review*.

ANCHOR BANDS.—There is no question whatever of the superiority of clamp bands for anchorage upon the molar teeth; they fit better, are more easily applied, are far more stable, and may be easily removed at any time. They may be easily cemented in place, overcoming the last objection to their use. The old-fashioned plain band, simply cemented on to provide anchorage for the appliance, has served its time, and better things have taken its place.—*Western Dental Journal*.

AN OLD QUESTION WITH A NEW ANSWER.—“Doctor, I broke a tooth from my plate while eating soft bread. It should not break that easy, should it?” Doesn’t that sound familiar, just as if you had heard it before? Soft—always something soft. Dr. Fahnstock, now of Cincinnati, is said thus to have answered this query propounded by a lady, “Why, yes, madam. D—n it, they frequently break while drinking coffee.”—H. G. LOGAN, Aurora, Ill., *Dental Review*.

FLUX FOR SOFT SOLDERING.—Pieces of zinc are dissolved in hydrochloric acid until the acid is saturated. The resultant solution of zinc chlorid is mixed with an equal amount of a mixture consisting of aqua ammonia and alcohol. After standing a few days the solution is filtered and ready for use. The so-called Miller’s soldering fluid consists of a solution of phosphoric acid in eight parts of water, to which one part each of lactic acid and glycerin have been added.—*Dental Era*.

TREATMENT OF SHALLOW EROSION CAVITIES.—In sensitive superficial cavities due to erosion or abrasion, warm solutions of trichloracetic acid in full strength applied two or three times, the cavity being dried between applications will often enable one to penetrate to sound non-sensitive dentin, after which the cavity may be prepared as desired. This procedure possesses real merit and is beneficial in many cases. In all these cases, sharp burs are essential to secure the minimum of suffering to the patient.—GEORGE GOW, *Dominion Dental Journal*.

COLORED ARSENIC MIXTURES.—Dr. G. V. Black long ago suggested that we mix our arsenic with sufficient lampblack, so that when placed within the tooth it may be seen plainly where it lies, and we may be able to detect any particles that might be disposed to crawl out of the cavity, and also in order to insure a complete removal of the dressing after the pulp has been devitalized. Anyone who will take the trouble to put up, or order from the druggist, a mixture of arsenic, morphin, and cocain, with lampblack in sufficient quantity to make a dull black, and will use this mixture for a time, would never think of doing without it.—GARRETT NEWKIRK, *Dental Review*.

TREATMENT OF PERICEMENTITIS. BY DR. EMILE SAUVEZ.—As a counter-irritant in the treatment of pericementitis, Dr. Sauvez recommends a preparation consisting of equal parts of tincture of iodin, tincture of aconite, and chloroform. The mixture should not be applied upon the gum with a brush, but by means of an orangewood stick, around the end of which a small amount of cotton has been wound. The cotton saturated with the solution is held for a short time in contact with the gum immediately below the neck of the tooth.—*Dental Cosmos*.

OIL OF CAJEPUT.—Dr. Arthur Matteson, many years ago, told us about the use of this agent in connection with guttapercha. In placing a temporary stopping in a shallow or saucer-shaped cavity, if the latter be moistened with oil of cajeput warm guttapercha will adhere to it with special tenacity. It is also an excellent root canal dressing previous to filling with the guttapercha cone—better for either of these purposes, I think, than the oil of Eucalyptus, and possessed of equal antiseptic properties.—GARRETT NEWKIRK, Pasadena, Cal., *Dental Review*.

BENDING THE ARCH.—The expansion arch often produces too great outward movement of the molar teeth, due to too much spring upon the molars and too little space between the bicuspid teeth and the arch. Expand the anterior portion of the dental arch first, ligating the bicuspids (and cuspids, if necessary) very tightly to the arch, and making little effort to expand in the molar region until toward the last of the operation. The fact that the expansion arch sometimes displaces the molars is due largely to failure to observe the foregoing details.—*Western Dental Journal*.

TO GILD ORTHODONTIA APPLIANCES.—Make a solution by dissolving ammonium carbonate and potassium cyanid, one ounce of each, in one pint of rain water. Attach the appliance to the zinc pole and a piece of pure gold to the carbon pole of any form of cell battery. Place the solution in a porcelain pan over a low flame, allowing it to boil slowly. Keep the appliance and gold in the solution from ten to fifteen minutes. The appliance will come out with a dark brown color, but after brushing it with a stiff brush filled with sodium bicarbonate, it will have a rich gold color.—DR. J. Q. BRYAM, *Review*.

REFACE GUM-SECTIONS.—The ground faces of the surfaces that make the joints of a set of some makes of gum teeth are porous, and because of this condition, whether worn for a week or a year, drink in saliva with matter held in solution and suspension, with the result that if the teeth are reset without further treatment this organic material is carbonized during vulcanization, giving the joints of the remounted set an appearance as offensive as if rubber-filled. Chemical treatment of the teeth when taken from the old plate helps matters somewhat; but the way of ways is to reface the ground surfaces by means of a fine wheel—corundum, carborundum or even a fine sandpaper disk. This treatment removes all of the affected and infected material, and yet not enough of the porcelain to make any appreciable difference in the spaces between the sections.—*Dental Office and Lab.*

**CAVITY MARGINS FOR INLAYS.**—Every portion of the cavity, and in particular the edges, should not only be well shaped, but brilliantly polished. With small Arkansas stone points a beautiful finish can be obtained, which should extend over the edges, giving everywhere in the neighborhood of the cavity a polished surface, from which it is easy to remove the matrix. It is folly to attempt making a perfect matrix against a sharp, uneven or rough edge, or to expect always to remove it without accident from a cavity around which rough surfaces have been left.—N. S. JENKINS, *Elliott's Quarterly*.

**LEAD PENCIL IN SOLDERING.**—In soldering up a crown or bridge, I find a common lead pencil a fine tool for teasing the solder to flow just where I want it. I prepare pencil for the work as follows: Sharpen pencil as for ordinary use, only making a longer slant to the point. I then cut the wood back, exposing lead for about one-half inch from the point. I then saturate the wood for about an inch up the shaft of pencil with diluted sulphuric acid. Then wrap lower part of shaft with strip of asbestos paper down to exposure of the lead and bind with wire thread.—W. H. SPAULDING, *Dental Secretary*.

**ROOT AMPUTATION WITHOUT PAIN.**—After the canals have been permanently filled, and if a painless operation is essential, it is my custom to inject into the gum a solution of cocaine, also giving the patient ten drops of volasem, which is a perfect antidote, and without which no more than a 2 per cent solution of cocaine should be used. Even a solution of this strength should be carried by a heart and respiratory stimulant. After the lapse of a minute or two plunge a drill in a direct line in the apex of the root, and proceed with the operation.—LENNOX CURTIS, M. D., *Items of Interest*.

**ANTISEPTIC AND ANESTHETIC PASTE.**—

White Vaseline .....	5 j
Cocain .....	.grs. xiv
Menthol .....	.grs. xxiv
Oil of peppermint.....	.grs. x
Chloreton .....	.grs. jx
Phenol .....	.grs. ij

Mix and apply before scaling the teeth by rubbing it into the spaces between the teeth and on the gums.—*Dentist's Magazine*.

**SOLDERING PLIERS.**—Take a pair of stiff soldering tweezers about six inches long and file a flat notch about an inch long on the inside of each point. Then take a piece of heavy iridio-platinum wire about two inches long and roll it flat and broad enough at one end to notch the width of the tweezer points. Drill two or three holes through each tweezer point and the flat ends of the iridio-platinum wire to match. Then with some soft steel wire rivet the iridio-platinum points to the tweezer points. You can then shape the points to your liking, and you will have a handy pair of soldering tweezers that will not corrode in acid or burn in any flame.—*Dental Record*.

A CHEERFUL OFFICE A NECESSITY.—Besides good and cheerful pictures and decorations and the most attractive current literature, the writer uses for the entertainment of the children a musical chair which plays when occupied; a group of bears, old and young, carved from wood, life-size forming a hall tree; rugs and skins of animals, etc., etc., a little art gallery carefully selected and arranged on the ceiling over the dental chair. This latter is invaluable for taking the attention of both little and big folks. It is used in several ways, to entertain or divert, to hold attention of the smaller children and keep their head in position.—W. A. PRICE, Cleveland, *Dentist's Magazine*.

To SPLIT AND REMOVE A CROWN.—Use a crown slitter. If you do not own one, or if you do own one that fails you, use your wedge-cutter, setting the distant angle of one blade under the edge of the gum, the other on a bit of wood on the occlusal surface of the crown. If this means fail also—and it will, quite often—drill a small hole in the crown a little distance from the grinding surface, and into this hole insert the angle of a thin chisel fixed in your automatic plunger. A few blows will slit the shell to the gum. Turning back the wings thus formed with a thin burnisher and giving the shell a pinch in a pair of hollow-nosed pliers completes the operation.—*Dental Office and Lab.*

ON THE MANIPULATION OF CEMENTS.—In mixing cements, be quick and active. There is a tendency in the profession to mix cements too thick. Get away from that tendency; get away from it as far as possible. The kneading or working with the fingers of a mixture of dental cement, prior to the introduction into a cavity, is all wrong. Fill your cavity flush and let it alone. Don't constantly disturb it till you cannot disturb it any more on account of the advanced stage of crystallization. If you agitate plaster of Paris while it sets, it gets crumbly. Please apply this fact to dental cements. If you introduce dental cement in the right consistence it will exhibit a glossy surface when set.—D. MAURICE ALBRECHT, *Dental Summary*.

TO REMOVE RUST FROM INSTRUMENTS.—*Pharmaceutische Centralblatt* prints an effective process for removing rust from surgical instruments. The instruments are placed overnight in a saturated solution of stannous chlorid, which causes the spots to disappear by reduction. The articles are then rinsed in water, laid in a hot solution of soda soap, and dried. It is well to rub them with absolute alcohol and prepared chalk. Another convenient method for removing rust is to lay the instruments in kerosene. Paraffin oil is the best preservative against rust, and the most convenient way of applying it without getting an unnecessarily thick coating is as follows: One part of the oil is dissolved in two hundred parts of benzine, and the objects, after being thoroughly dried and warmed, are plunged into the solution. Instruments with joints, as scissors or needle-holders, are washed in the fluid, in order to cause it to penetrate into all crevices, and the benzine is then allowed to evaporate in a dry room.—*British Dental Journal*.

ADVICE TO THE YOUNG PRACTITIONER.—If a new theory or new method is suggested, it is your duty to see what there is in it. You don't want to wait for others to investigate for you. He who stands back and waits for others to find out first whether this method or this practice is a good thing, isn't worth a "hill of beans," either to himself or his profession. He is losing a lot of valuable time and thereby checks his growth, stunts himself, stays in a rut, becomes a back number, and finally dies of dry rot. If there is anything advanced that may enable you to do better work and serve your patients better, you want to "get onto it" at the very earliest moment. You cannot afford to wait and let others get there first.—C. B. ROHLAND, Alton, Ill., *Dental Review*.

SOCIETY.—

Play a little ping-pong,  
Have a little chat,  
Make a little chocolate fudge,  
Then go and find your hat.  
Say you've had a jolly time  
As she waves her fan,  
Now, isn't that exciting sport  
To tempt a healthy man?

—*Exchange.*

GERMPROOF, NON-IRRITANT ROOT FILLING.—A thread of cotton is wrapped around a smooth broach dipped into tincture of iodin, then into finely powdered tannic acid, then forced to the apical end of the canal. Dry the canal so that all excess of iodin is removed (and there should be very little), wipe out the canal with alcohol and then fill with whatever material suits the operation. I generally use medicated guttapercha covered over with cement. Discoloration of tooth will result only from carelessness in method of operation. Sepsis will not recur as you have a material which becomes as hard as cement sealing the apical foramen perfectly, non-irritant antiseptic and germproof.—N. N. WYCOFF, *Items of Interest*.

A SOURCE OF DANGER.—To anesthetize a tooth for the preparation of a cavity, I fail to see the necessity of combining adrenalin chlorid with cocain—cocain is considered a general poison of protoplasm; it produces a feeling of constriction and contraction of the vessels; its stringent feeling is easily explained by its affinity for protoplasm. So with this drug, we have an agent that produces paralysis of the vessel-walls; i. e., of vaso-motor nerves. Black's researches show that vessel-walls may recover their tone and the vaso-constriction nerves their functional activity after slight paralysis, but if they are subjected to over-stimulation they become inactive and the vessel-walls yield to the pressure of the blood column, and the result will be death of the pulp. The reaction depends wholly upon the amount of disturbance there has been produced in the blood vessels; therefore, the less constriction there is produced, the less danger there is of any after effect.—D. H. ZEIGLER, Cleveland, *Dentist's Magazine*.

**CAPPING PULPS.**—Remove all decayed dentin that is practicable without injuring the pulp tissue, then wash the cavity with lukewarm chloroform water and dry with absorbent cotton. Then wipe the cavity with a pledget of cotton saturated with the following solution: Dissolve fifteen grains of thymol in one dram each of oil of cloves and chloroform. Then mix oxid of zinc and eugenol to the consistence of soft putty, and cover the exposure and partly fill the cavity with it. Over this place a temporary protecting filling for several days. After sufficient time for testing if the tooth is comfortable, remove the dressing and refill with a paste of zinc oxid and eugenol paste and cover with a cement protecting filling.—F. H. AUJUBALT, *Cosmos*.

**FORMAMINT TABLETS.**—Formamint (which is a chemical combination of formic aldehyd with lactose) has just been placed on the market in the form of tablets, which contain, with the addition of sugar and gum arabic, a proportion of 0.01 formaldehyd, by weight, in 1 gm. of the total combination. Citric acid is added for the purposes of palatability, while a few drops of pepsin-hydrochloric acid ensure the liberation of free formaldehyd during the solution of the tablets in the mouth. The tablets are odorless, and possess a pleasant, refreshing taste. It is obvious from their composition in what circumstance these tablets may be used, but they are especially intended for the treatment and prevention of inflammatory conditions of the mouth and throat.—*Brit. Dent. Jnl.*

**MIXING AMALGAM.**—It is my conviction that the mixing of amalgam in the hand is unscientific and unclean. I cannot see how anyone can expect to get good results from such a procedure, incorporating sebaceous matter and bits of cuticle into a filling for a tooth. Take your knife blade, scrape the palm of the hand with it and you can see what goes into your filling. Try mixing your amalgam with a stiff steel spatula on glazed paper. Begin with the mortar mix, then transfer to the paper and with the spatula triturate it thoroughly by placing the spatula on the mass and draw it toward you. Mix in this manner three or four times, using a clean place on the paper each time, and it will also clean the amalgam.—H. N. JACKSON, Milwaukee, Wis., *Dental Review*.

**TO REMOVE MODEL FROM ARTICULATOR.**—It not infrequently happens that a model is broken in removing it from the articulator. To insure the easy removal of even a very thin model, have three or four sizes of iron plates convenient. These plates are one-twelfth of an inch in thickness, and about the size of the bottom of the model. The plate should have three or four quarter-inch holes in it. In putting a model on the articulator, put the plate on the jaw of the articulator, and the model on the plate with a little soft plaster to hold the plate to the articulator, and the model to the plate. When it is desired to remove the model, slip a knife or chisel between the plate and articulator, and pry the plate and model off together. As the plate is rigid there is no danger of breaking the model. The plate is flasked with the model and recovered after vulcanizing.—C. R. SMITHERS, *Western Dental Journal*.

The fields are damaged by hurricanes and weeds; mankind is damaged by passion, by hatred, by vanity and by lust.—*Buddha*.

**BE CAREFUL WITH YOUR ANESTHETICS.**—The universal dread of pain and the necessity for the infliction of more or less pain by the dentist in his operations, has caused untold suffering to the human race and the loss of thousands of teeth. We and our patients sometimes think that if the element of pain could be eliminated from our operations, life would be a continual round of pleasure. Since this is true, it is small wonder that the use of anesthetics is being pushed to the limit. Dentists are human, and if they can substitute smiles for groans and compliments for execrations, the temptation is great to overstep the bounds of caution. Recognizing the above as universal traits of human nature, it requires courage to refuse an anesthetic. Remember, however, it is a chance and responsibility which no one can divide with you. Can you afford it?—M. A. HANAFORD, Rockford, Ill., *Dental Review*.

**PRESERVING PEROXID OF HYDROGEN.**—Various agents have been used for the purpose of preserving peroxid of hydrogen, such as sulphuric and phosphoric acids, ether, and 95 per cent. alcohol. M. Allain, at a recent meeting of the Paris Society of Pharmacy, stated that sodium chlorid, in the proportion of 10 grammes per liter, contributes very considerably to the stability of hydrogen peroxid. Calcium chlorid acts similarly. The addition of sodium chlorid does not alter the acidity of the solution, and M. Allain ventured on the opinion that a chemical combination is formed, which he hopes to isolate. As much of the peroxid of hydrogen sold by druggists is used for bleaching the hair, there does not seem much objection to adding the small proportion of salt. On the other hand, it should be noted that objection might be taken in some quarters to the presence of a body which is not normally a constituent of hydrogen peroxid.—*Chemist and Druggist*.

**SODIUM DIOXID BLEACHING.**—The dam is placed over the tooth and adjacent teeth. A thin platinum band is wrapped around the tooth to be bleached, and white guttapercha warmed and used to form a pocket about the cavity.

By the use of a small gold or platinum spoon, some sodium dioxid is placed in the cavity and forced some distance up the root canal with a glass instrument. Distilled water is now dropped into the cavity and the band of platinum held over the cavity to force the generated oxygen into the dentin. After sufficient time to allow the oxygen to work the cavity should be washed and dried, and the operation repeated, if necessary.

Should it be found impossible to remove the pigment mechanically with water, a 3 per cent. solution of sulphuric acid may be used to chemically dissolve it, after which wash with water and let dry, preferably without using hot air. Now brush a pasty precipitate of calcium phosphate and distilled water into the lower third of the root and against all exposed dentin. Make a base for final filling, using light-colored cement.—DR. R. B. TULLER, *American Dental Journal*.

HIGH PRESSURE ANESTHESIA—HOW TO SUCCEED.—The secret of success in using the high pressure syringe seems to be:

1. Do every operation under absolutely aseptic conditions, or as nearly so as possible.
2. Make your pit so that you can force the solution in the direction of the long axis of the tooth, and be very careful to hold your syringe in that direction.
3. See that you have a plain hard surface of dentin where you wish to make the pit and normal to long axis of tooth.
4. Use a clean fresh solution of cocaine (no other drug) not to exceed a 3 per cent.

By closely following the above directions I have been able to succeed in a large per cent of the cases where my students failed.—EGBERT T. LOEFFLER, Ann Arbor, Mich., *Dentist's Magazine*.

COCAIN.—While cocaine has been a great blessing to mankind, it has also been a great curse, and is becoming more so every day. The facility with which the tooth pulp may be anesthetized and removed, and crown and bridge work substituted for well-made fillings and partial plates, affords the dentist an opportunity to display his wonderful skill to the people, and at the same time reap a rich financial harvest, so that a great majority of the profession have become crown and bridge work maniacs. I have seen so much injury to the gums, alveolar process and bone, resulting from hypodermic injections, that I would prohibit the use of cocaine in my office if I thought the trouble arose from the use of cocaine *per se*. But I am of the opinion that the trouble frequently comes from the septic matter carried into the tissues beyond by the needle rather than by the irritating properties of the drug itself.—C. P. PRUYN, Chicago, *Dental Review*.

IMPRESSION MATERIALS.—The following, from a recent number of the *Chemist and Druggist*, may interest some of our readers: Beeswax is mixed with a limited proportion of hard paraffin (1 to 7), when used as a dental impression wax to give the mixture the property of separating easier. Parfin wax cannot replace the beeswax entirely, or in large proportions, as it lacks the plastic properties which are needed in dental work. The dental modeling compound or composition used for impressions in place of wax is composed of stearin, gum dammar or cowrie, and French chalk colored with carmine. The several varieties—hard, soft, etc.—are made by varying the quantity of stearin and chalk in proportion to the dammar or cowrie. A receipt is given in "Pharmaceutical Formulas" as follows:

Stearin .....	5vij
Gum dammar .....	5xij
French chalk .....	5xxij
Carmine to color.	

Mix the stearin and shake into it the gum dammar, previously powdered, then add the chalk tinted with the carmine, and perfume with *ol. geranii*,  $\frac{3}{2}$ v.

**UNIFORM FEE BILL.**—With our methods for the same operations in many cases so different, with a patient frequently incapable of understanding the nature of the operation going from one office to another and honestly or designedly misrepresenting the different offers made; with a suspicious public always alert for anything that looks like a combine; with unprincipled practitioners ever anxious to quote or misquote that they may gain; with those coming to us whom we judge poor and deserving; those whom we call personal friends; and those to whom we extend professional courtesy; with frail human beings for dentists, born with passions the same as other men, to love, to fear, to hate, would it not be surprising if we did not lower the dignity of our profession, and by unwarranted suspicion create "an opposition that did not exist?" With these conditions ever existing among us, is there any one thing more prone to sow universal discord in a dental society than a compulsory uniform fee bill?—T. P. DONELAN, Springfield, Ill., *Dental Review*.

**ROBBERIES.**—Rush Crissman, Rock Island, Ill., Sept. 3, \$500.—Malcolm Rebb, St. Louis, Mo., Sept. 3, quantity of gold.—C. W. Lupfer, Springfield, O., Sept. 4, \$35.—A. J. Dubois, Neenah, Wis., Sept. 3, \$200.—Dr. Lashy, Fairmont, Minn., early in September, a quantity of gold.—Dr. Gares, Columbus, O., Sept. 5, quantity of gold.—Sandifer and MacDaniel, Birmingham, Ala., early in September, \$60 and checks. The thief was captured and lodged in jail.—T. P. Sullivan, Fall River, Mass., Sept. 6, a clock.—B. L. Kirby, Springfield, Ill., Sept. 7, \$20.—John J. Madden, Buffalo, N. Y., Sept. 8, quantity of gold.—M. W. Flynn, Pittsfield, Mass., Sept. 8, \$200.—D. H. Smith and Bartlett Brothers, Holyoke, Mass., Sept. 9, \$225.—G. W. Thaphagen, Northampton, Mass., Sept. 9, \$50.—Dr. Essig, Dowagiac, Mich., Sept. 10, \$25.—The thief who broke into the dental office of G. F. Ramsey, Milwaukee, Wis., several weeks ago, and who was captured, was sentenced Sept. 12 to four years' imprisonment.—Drs. Conkey, Moore and Johnston, Appleton, Wis., Sept. 13, \$15, \$30 and \$14 respectively.—W. F. Taylor, Fond du Lac, Wis., Sept. 14, \$60.—John E. Hineman, Youngstown, O., Sept. 14, \$150.—A. G. Doane, Springfield, Mass., about Sept. 9, \$60.—Cassius C. Keith and Fay Badcock, Hastings, Neb., Sept. 18, each lost a quantity of gold.—Snyder Brothers, Lowell, Mass., Sept. 18, some postage stamps were taken, but the thieves were unsuccessful with the safes.

**A SOLDERED GOLD CROWN FROM ONE PIECE OF METAL.**—After securing the root measurement I cut the gold to the required length, so that when it is turned over and soldered, the band will exactly fit the root. Then I take a pair of shears and on one end of the band cut about twenty slits. These little sections are forced over the end of the form which I have made to resemble somewhat the end of the tooth that is to be crowned. Take this band, which now roughly resembles a crown, place it on the root in the mouth, and trim approximately to the right length, so that when the patient closes the mouth the occluding tooth will force itself into the soft end constituted by the sections lying one against the other. This gives a perfect articulation in most cases, and, as the slits readily

yield, they can be bent until a perfect articulation is secured. The flux is then put on the outside of the articulating end of the crown, and the solder on the inside; the crown is held over the flame, so that when the solder melts a good backing of solder is obtained, which will permit of the crown being ground to suit the articulation. I claim for this method simply that we can secure a good fit of the root with the band, because we can see what we are doing; also that by allowing the patient to force the teeth into this soft end we get a better occlusion than when the crown is made in the ordinary way. This is simply a little novelty that has proved quite helpful to me.—H. M. SCHOOLEY, *Cosmos*.

MARRIAGES.—C. J. Altmir, a dentist of Rudolph, O., was married to Miss Adah May Henry, of Columbus, O., Sept. 19.—E. J. Berry, a dentist of Kansas City, Mo., was married to Mrs. Mary Stewart Chiles of Independence, Mo., Sept. 12.—Earl Brooks, a dental student of Indianapolis, Ind., was married to Miss Stella Miesse of Noblesville, Ind., Sept. 25.—C. R. Burnett, a dentist of St. Louis, Mo., was married to Miss L. E. Stoffel of St. Louis, Mo., Sept. 8.—Frank L. Carr, a dentist of Zanesville, O., was married to Miss Bertha Mohler of Zanesville, O., Sept. 4.—Thomas Clark, a dentist of Chicago, Ill., was married to Miss Fannie Rothenberg of the same city, Sept. 3.—C. O. Clemmer, a graduate of the Indianapolis Dental College, was married to Miss Gertrude Lemon of Grindley, Ill., Sept. 5.—Albert A. Cook, a student of Detroit Dental College, was married to Miss Mayme L. Moore of Lansing, Mich., Sept. 12.—Lester D. Chisholm, a dentist of Everett, Mass., was married to Miss Marjorie C. Bruce of Three Rivers, Mass., Sept. 12.—Andrew B. Culhane, a dentist of Rockford, Ill., was married to Miss Ida M. Sullivan of Rochelle, Ill., Sept. 11.—R. E. Frech, a dentist of St. Charles, Ia., was married to Miss Emma Fischer of Des Moines, Ia., during the latter part of August.—R. A. Greenawalt, a dentist of Lamont, Ia., was married to Miss Stella M. Russel of Tiffin, Ia., Sept. 12.—Thomas Porter Gunning, a dentist of Princeton, Ill., was married to Miss Abbie Wilson of St. Charles, Ill., Sept. 19.—W. W. Hart, a dentist of Chicago, Ill., was married to Miss Julia Tevis Pusey of Valley Station, Ky., Sept. 4.—W. T. Hoard, a dentist of McKinney, Tex., was married to Miss Margaret White of Baltimore, Md., Sept. 12.—Frank C. Horton, a dentist of Clyde, N. Y., was married to Miss Grace E. Miller, also of Clyde, Sept. 10.—L. A. King, a dentist of Williamsport, Ind., was married to Miss Clara Donovan of Williamsport, Ind., Sept. 11.—F. R. Merz, a dentist of Chicago; Ill., was married to Miss Emma Huebner of St. Louis, Mo., Sept. 15.—Charles Warren Miller, a dentist of New Ulm, Minn., was married to Miss Verna Mabella Hanson of Rochester, Minn., Sept. 5.—Harry G. Nelch, a dentist of Springfield, Ill., was married to Miss Alice Mae Withey, also of Springfield, Sept. 10.—C. D. Owens, a dentist of Buchanan, Mich., was married to Miss Bessie Ravelle of Grand Rapids, Mich., Sept. 4.—Charles Quackenbush, a dentist of Pentwater, Mich., was married to Miss Nellie Sargent of Fonda, Ia., Aug. 22.—James Sebastian, a dentist of Baltimore, Md., was married to Mrs. Carrie Alderson of Fort Royal, Va., Sept. 25.